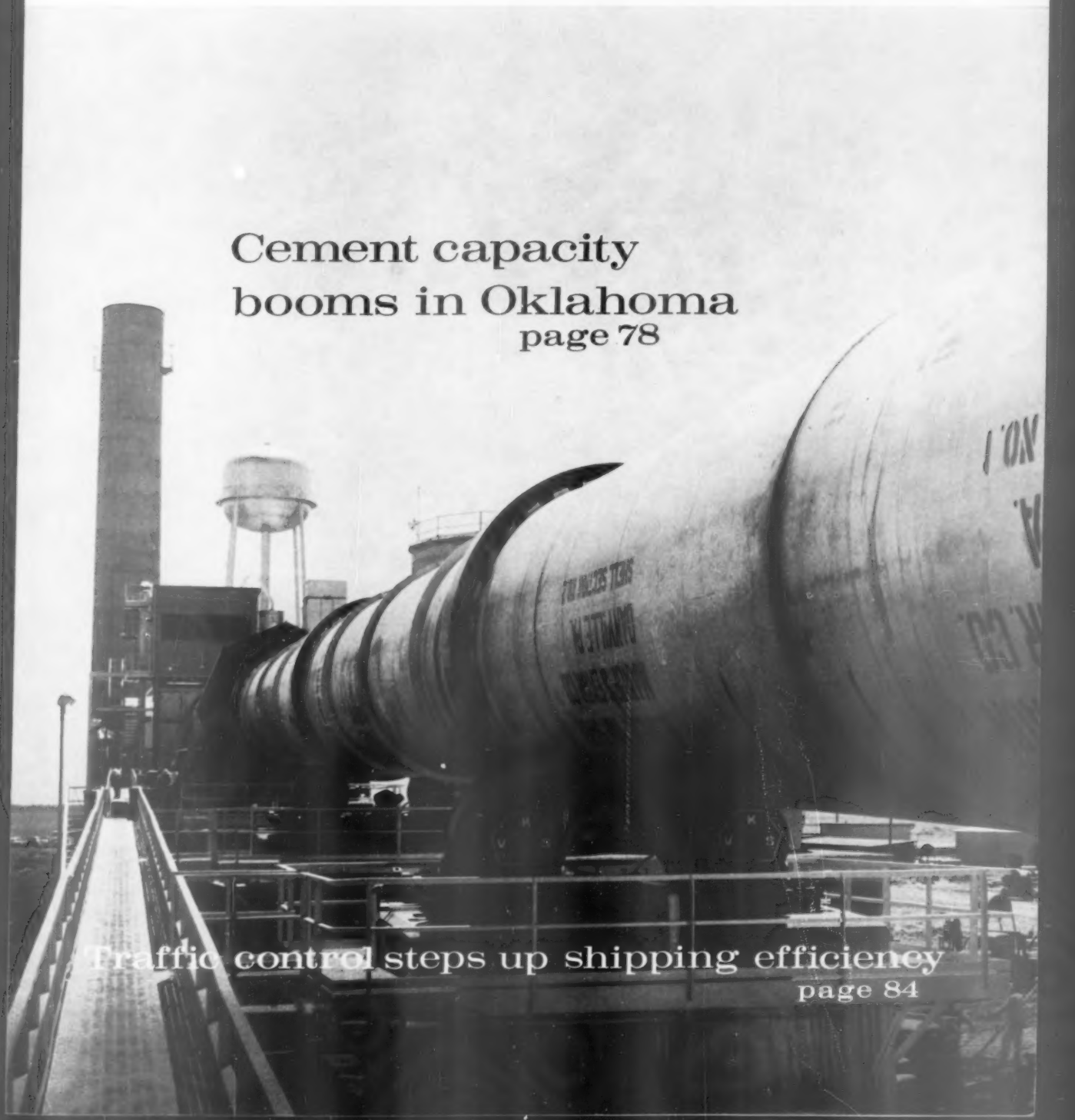
DECEMBER 1960

ROCK PRODUCTS



Cement capacity booms in Oklahoma
page 78

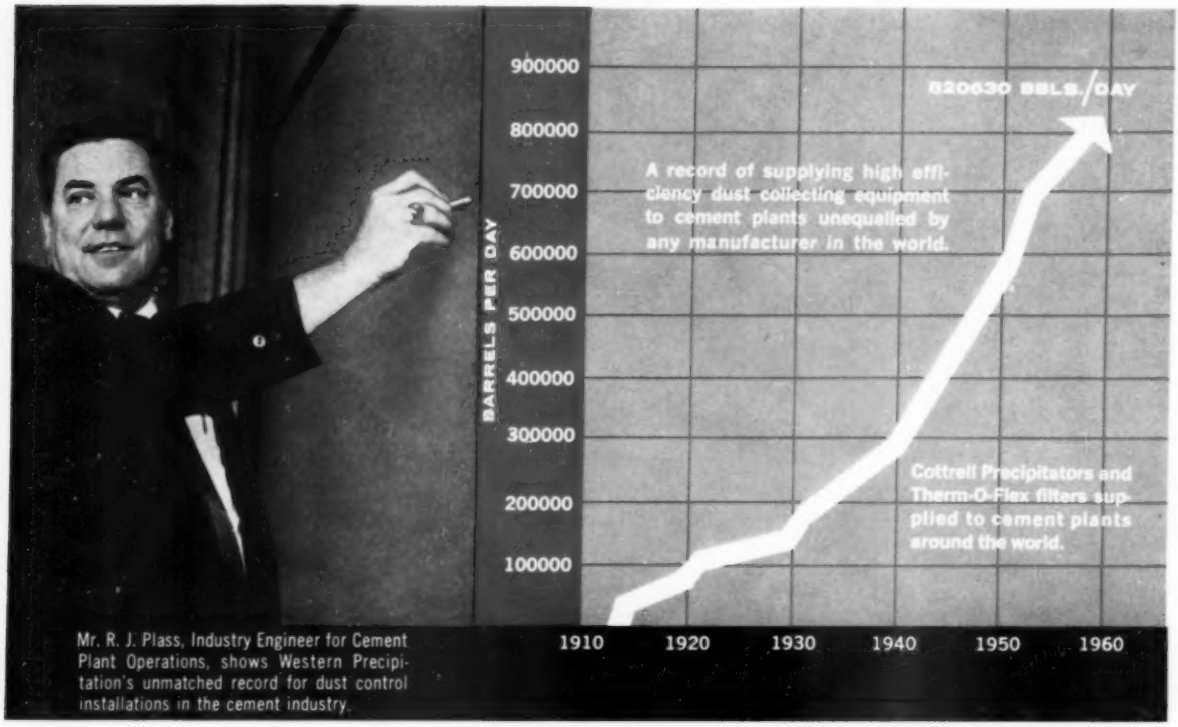
Traffic control steps up shipping efficiency
page 84

A WORLD-WIDE "EXPERIENCE RECORD"

UNEQUALLED IN THE ENTIRE CEMENT INDUSTRY!

Since its first cement plant installation almost a half-century ago, Western Precipitation has installed dust collection equipment on cement plants with a combined operating capacity of over 820,000 barrels per DAY... a record for wide-range experience, for customer satisfaction and overall "know-how" of kiln dust control that is unequalled in the entire industry!

Not only is this a testimonial to the reliability of Western Precipitation equipment (for the major percentage of these installations were repeat orders from satisfied customers) but it is also an indication of the way Western Precipitation equipment has kept pace with new processes and new advancements as they have been adopted by the cement industry.



Mr. R. J. Plass, Industry Engineer for Cement Plant Operations, shows Western Precipitation's unmatched record for dust control installations in the cement industry.

Regardless of your type of operations, Western Precipitation engineers can provide an unbiased evaluation on the type of equipment best suited to your particular requirements—an evaluation backed by the industry's top organization in cement plant dust control!

"Cottrell" Electrostatic Precipitators—the equipment pioneered by Western Precipitation for high efficiency, long life electrostatic separation of dust particles from gas streams.

"Multiclone" Centrifugal Collectors—the multiple small-tube mechanical collectors pioneered by Western Precipitation for high-efficiency, low maintenance centrifugal separation of dust particles from gas streams.

"Therm-O-Flex" High Temperature Filters—the woven glass filter systems that handle gas inlet temperatures as high as 600°F. and feature new type silicone-treated filters that can be cleaned automatically without destructive shaking or high-frequency vibration.

Write for descriptive literature on Western Precipitation's equipment for kiln dust collection!

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DIVISION OF JOY MANUFACTURING COMPANY

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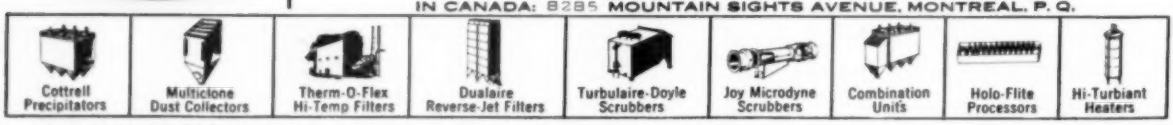

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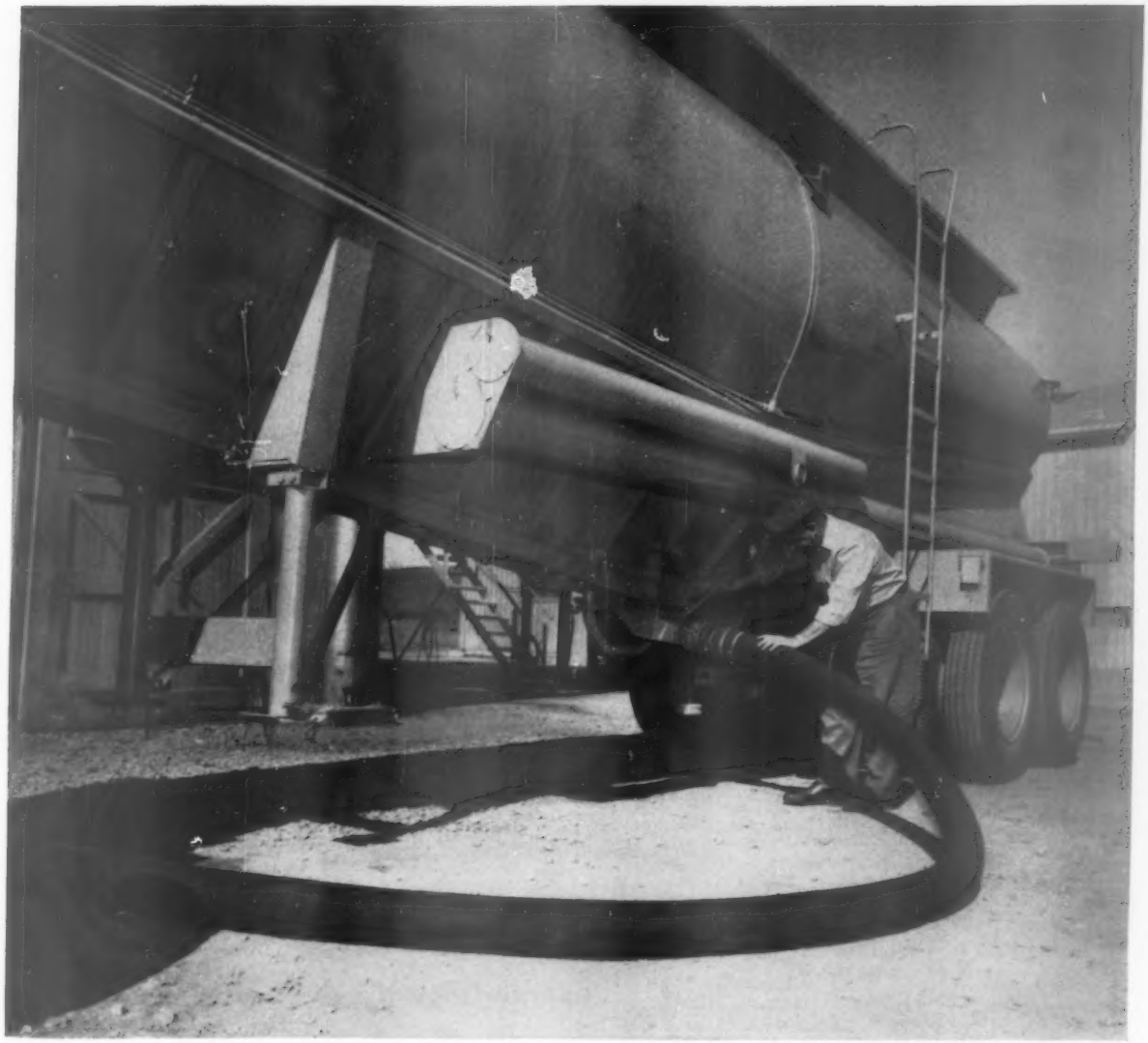

Photo courtesy Chemical Tank Lines, Inc., Downingtown, Penna.

Hose gulps dry cement, unloads truck in 30 minutes

Fast handling of bulk cement gets big assist from B.F.Goodrich hose

WHOOSHING through that hose at a 5-barrel-a-minute clip is dry cement on its way to storage hoppers. Unloading with hose instead of screw-type metal conveyors is faster and cleaner; hook-ups are easier to make. But the job couldn't be done with an ordinary hose. Friction of the abrasive particles would wear it out fast.

A big equipment manufacturer brought the problem to B.F.Goodrich. Specifications were worked out, and a hose with a special kind of lining was recommended. This lining is so tough it has been used in some places to handle broken glass and granite chips.

Now, with B.F.Goodrich hose, bulk trailers operated by Chemical Tank Lines, Inc., Penna., can unload 113 barrels of cement in 30 minutes. The hose in the picture has been used 15 months, shows no sign of wearing out.

Because it's light and flexible, workmen find this BFG hose easy to handle, fast to connect. No need to jockey trucks back and forth to find just the right spot. The hose cover is built to take dragging over rough ground, exposure to all kinds of weather.

For more information on this new cement-handling hose—or any of the many different products BFG makes for industry, write *B.F.Goodrich Industrial Products Co., Dept. M-897, Akron 18, Ohio.*

B.F.Goodrich

CEMENT-HANDLING HOSE

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ROCK PRODUCTS

a Maclean-Hunter publication, Vol. 63, No. 12

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December 1960

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ROCK PRODUCTS magazine is published monthly by Maclean-Hunter Publishing Corp., 79 W. Monroe St., Chicago 3, Ill.; P. D. Allen, President.

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Second-class postage paid at Chicago, Ill. and at Long Prairie, Minn. *Subscription Information*—Subscription price: United States and possessions, Canada, one year, $3.00; two years, $4.00; three years, $5.00; U.S., single copy, 50¢. Pan-American, one year, $8.00; two years, $14.00; three years, $20.00; all other foreign, one year, $12.00; two years, $22.00; three years, $30.00; single copy, $1.00. Canadian subscriptions and remittance may be sent in Canadian funds to ROCK PRODUCTS, P.O. Box 100, Terminal "A," Toronto, Canada. *To subscribers:* Date on wrapper indicates issue with which your subscription expires. In writing to have address changed, give old as well as new address. ROCK PRODUCTS is indexed regularly by Engineering Index, Inc. and Industrial Arts Index.

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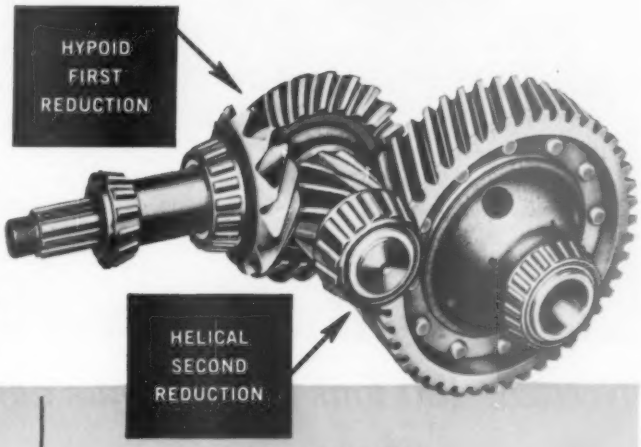
Timken-Detroit balanced hypoid-helical double-reduction gearing is unequalled for top performance and dependability. Outstanding advantages that make it the choice of heavy-duty equipment manufacturers and operators are: big, husky gears . . . greater flexibility in gear ratios . . . balanced gear set loadings . . . long life and low maintenance costs. The hypoid first reduction is 30% stronger than spiral bevel, and works in series with the second reduction to take an equal share of the load. In the helical second reduction, strong helical gears with a wide range of ratios insure balanced double-reduction gearing.



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Two full-sized gear sets form a balanced power train—with each gear set accomplishing a substantial reduction. This combination of husky hypoid first reduction gears coupled with rugged, wide-faced helical second reduction gears provides a double-reduction gear set that outperforms all others. Because the ratios of each reduction may be varied, you get a balanced power train with the larger selection of axle ratios for maximum operational versatility and performance.

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A true two-speed axle which provides two separate gear ratios through the use of two full-size helical gear sets . . . a "fast" ratio for maximum speeds and a "slow" ratio for greatest pulling power. Pick the most efficient gear ratio to meet your requirements of speed, load and road. Spring-flex power shifting provides simple, positive shifting with either air, vacuum or electric actuation. Timken-Detroit two-speed hypoid-helical double-reduction axles give a versatility and economy to trucking operations that is unmatched by other axle gear designs.

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INTERCHANGEABLE BALANCED DOUBLE-REDUCTION DRIVES

Another Product of...

ROCKWELL-STANDARD CORPORATION

ROCKWELL R STANDARD

Transmission and Axle Division, Detroit 32, Michigan

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Needed: 190 tons of ¾" minus aggregate per hour

New Diamond Plant Gets Job

Another feature that impressed Frank Strausberg is the portability of the new Diamond model 70 rotor-lift crushing plant. It is equally at home on the road or in the pit.

When Frank Strausberg & Son, Saginaw, Michigan contracting firm, was awarded a contract for aggregate for asphalt surfacing and shoulders on State Route 57, it needed a crushing plant that had plenty of capacity and portability. Diamond Iron Works sales engineers were called in and asked for their recommendations.

Based on a thorough and convincing analysis of the problem, Strausberg purchased the *new* Diamond model 70 rotor-lift crushing plant. Here are the results. Currently, it is producing ¾" minus aggregate for asphalt surfacing at the rate of 190 tons per hour. All material is pit run requiring 48% crush and subject to state check four times a day. The plant is moved about every three days in the pit, or to other pits. It has more than lived up to expectations for high capacity and portability. Also, of particular importance has been the smooth performance plus an unusually low horsepower requirement.

Other Features of the New 70

- **10" x 36" roller bearing jaw crusher**
- **32" x 24" star gear roll crusher—a large crushing area for more crushing per revolution of rolls**
- **4' x 12' 2 ½-deck screen that provides more than adequate screening area**
- **30" conveyor belts throughout (5-ply, 28 oz.)**

High output, portability and economy of operation . . . that's what the new 70 has done for Frank Strausberg & Son . . . that's what it can do for you. See your DIAMOND distributor for the full story.

Diamond makes everything for the aggregate producer:

Jaw Crushers • Roll Crushers • Conveyors • Screens and Washers • Feeders and Bins • Portable and Stationary Crushing Plants for Rock and Gravel.

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DIAMOND

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SO....YOU HAVE ROCK TO BREAK!

OLD COLONY crushed stone swings a mean "Head Ache Ball" with their new Model 6 Northwest Crane. This machine is a 40-ton crane, complete with Independent High Speed Boom Hoist, Folding Gantry, Telescopic Boom Struts — all the Crane equipment that will assure smooth operation and accuracy necessary to get output on quarry rock like this.

It doesn't matter whether it's breaking stone or setting steel, Northwest Cranes bring you a combination of advantages that make money.

These smooth working Northwest Lifting Cranes are always ready to go. Heavy-duty Independent High Speed Boom Hoists stand hour after hour booming. There is plenty of cable capacity and a 3rd drum gives you three load lines. Smooth swing and the *true* feel of the load which comes with the Feather-Touch Clutch Control assures greater accuracy in spotting loads. Sectional Boom Hoist Rigging, Pendent Lines and Boom Struts, Flange connected Booms with either open or closed throats — everything you require for any crane operation is available.

If you are considering new Crane, Shovel, Dragline, Pullshovel or Truck Crane equipment, give some thought to why so many Northwests are repeat orders. *Let a Northwest man bring you up-to-date on the latest Northwest advantages.*

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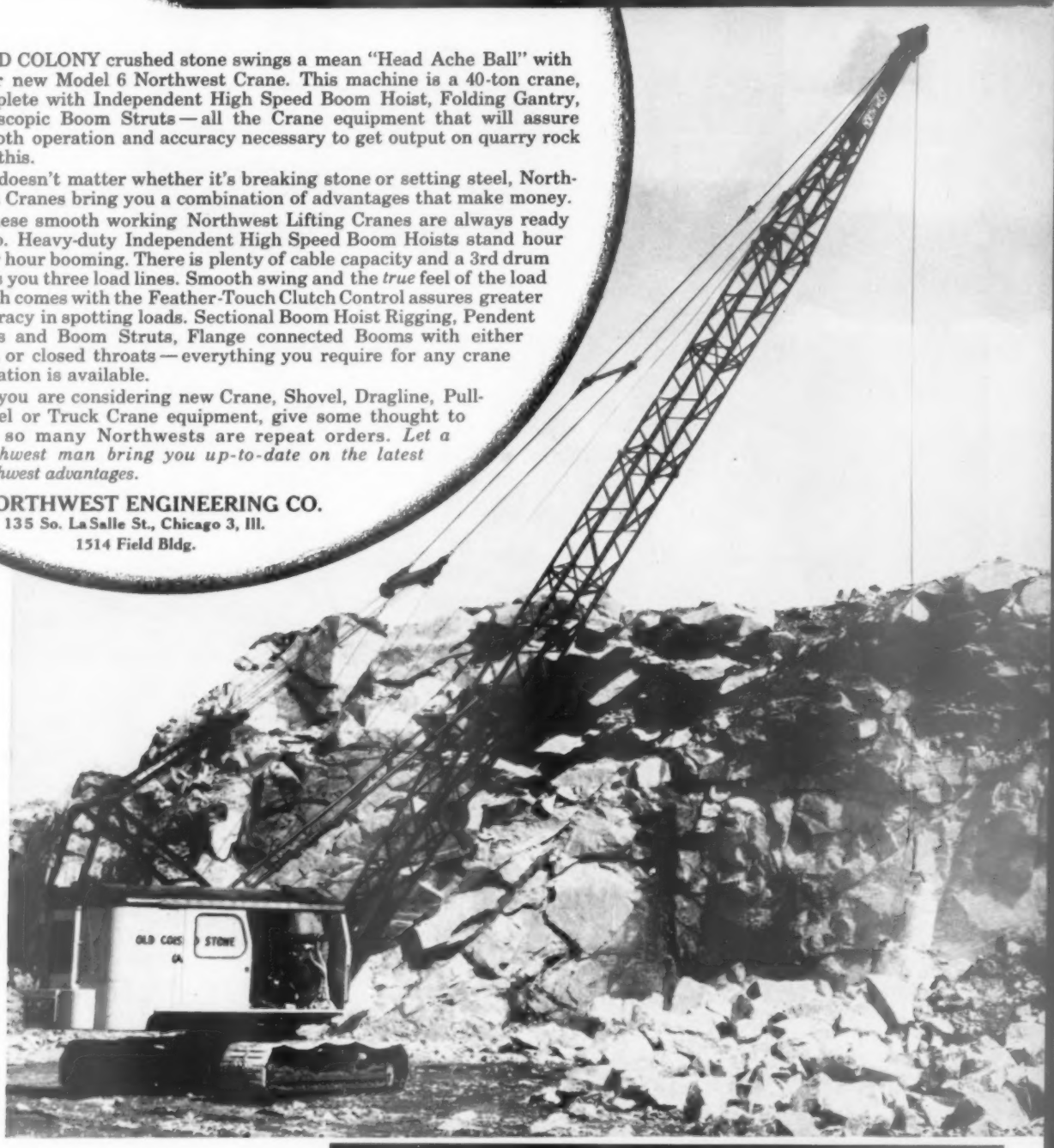

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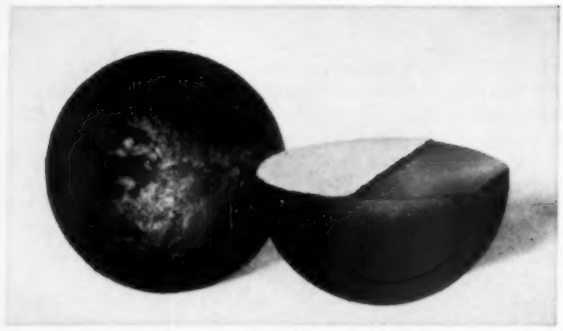
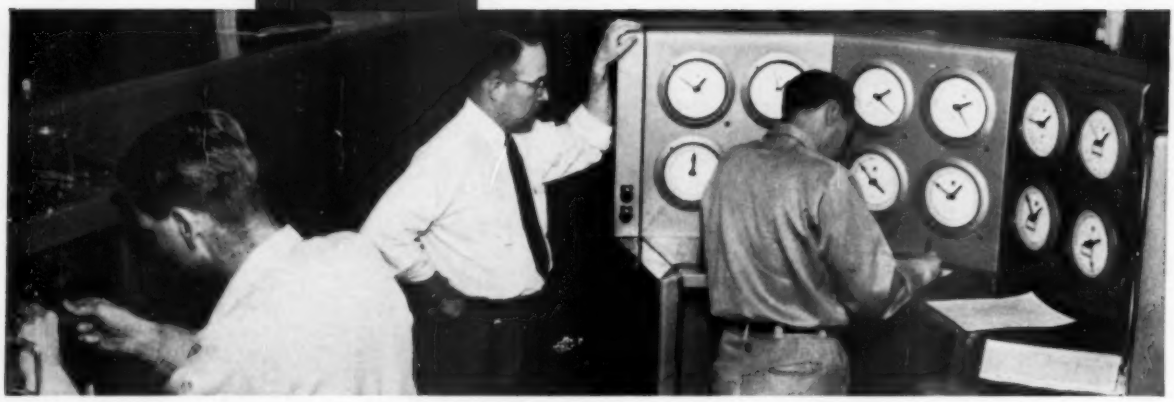
NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES

SHOVELS	CRANES	DRAGLINES
¾ Yd. to 2½ Yd. Capacity	13-Ton to 60-Ton Capacity	¾ Yd. to 3 Yd. Capacity
PULLSHOVELS	**TRUCK CRANES**	
¾ Yd. to 2½ Yd. Capacity	25-Ton and 35-Ton Capacity	

3/4 to 3
Cubic Yard Capacity

New steels are born at Armco





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Moly-Cop Balls are Sheffield-made from furnace to finished ball. Statistical quality controls are on the job at every step of production. That's why you can count on consistently high performance, long wear and greater grinding economy with Moly-Cop Balls. Why settle for anything less?

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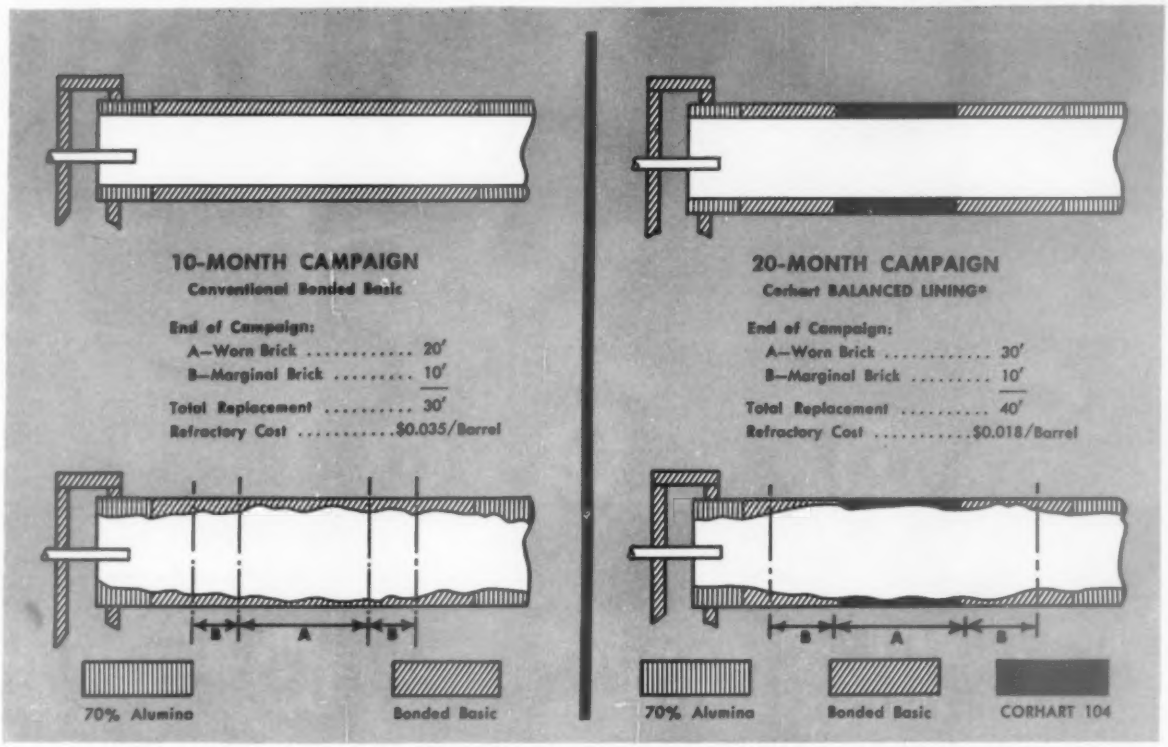
CORHART PROVES IT IN THE HOT SPOTS!



Will you pay 50% more to increase hot zone refractory life by 100%?

CORHART 104 costs somewhat more than conventional basic refractories. But for a very good reason. Corhart 104 is an electrically-melted, high-density refractory which outlasts other basic hot-zone liners by more than 2-to-1.

Many leading cement producers are using Corhart 104 to eliminate small, costly "hot spots" in their kiln hot zones. These are the troublesome wear areas which repeatedly cause premature repair shutdowns before major refractory replacement takes place.

Surprisingly small amounts of this ELECTROCAST refractory in a Corhart BALANCED LINING* permit better utilization of conventional refractories and economically increase kiln refractory life.

Send for your free copy of the full-color brochure illustrating the many advantages of Corhart 104 BALANCED LININGS. Corhart Refractories Company, Incorporated, 944 Commonwealth Bldg., Louisville 2, Kentucky.

**Trade Mark*

QUALITY ECONOMY ENDURANCE

CORHART REFRACTORIES COMPANY

Subsidiary of Corning Glass Works

The words "Corhart", "ZAC", and "Electrocast" are registered trade marks which indicate manufacture by Corhart Refractories Company, Incorporated.

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The New Earth-Mover

Especially designed by Goodyear for today's high-powered earth-moving equipment

As you know, today's earth-movers move bigger loads faster than ever before.

To meet the added burden imposed on rims, Goodyear has developed a complete new line of Earth-Mover Rims that are now 40% stronger – yet add an average of only 6% to rim weight.

With Goodyear Earth-Mover Rims you enjoy such additional benefits as a heavy-duty bead seat band driver – to prevent slipping under severest operating conditions. And you get the positive air seal provided by Goodyear's famous Tru-Seal principle.

Goodyear makes rims in widths up to 37" and diameters up to 49". To prevent premature tire and rim failure, it pays to buy and specify rims job-fitted by Goodyear. See your local rim distributor, or write: Goodyear, Metal Products Division, Akron 16, Ohio.

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–84 pages of facts and pictures on Goodyear's complete line of rims for every type of vehicle.

Tru-Seal – T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

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Only Goodyear Rims have *Bond-A-Coat Finish,* for lasting protection against rust and corrosion.

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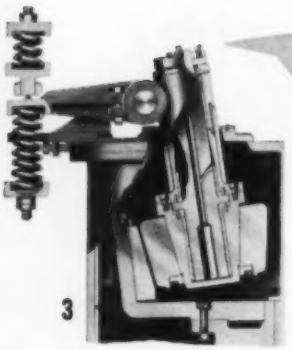
RAYMOND BOWL MILLS

1



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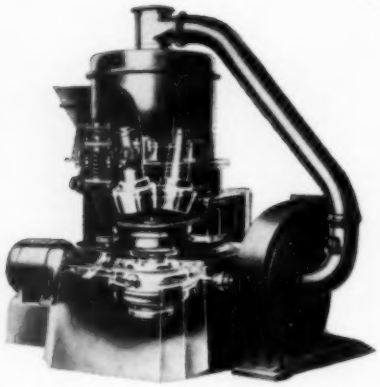
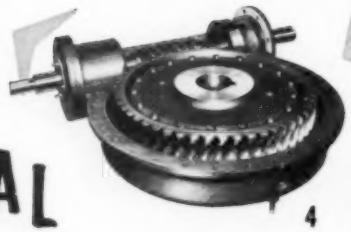


2

almost PERPETUAL MOTION...



4

THE CONTINUOUS, ROUND THE CLOCK, OPERATION OF RAYMOND BOWL MILLS BORDERS ON PERFECT AUTOMATION.

Capacities of over 18 million tons annually, with 390 units in use on kiln firing alone, is the record set by Raymond Bowl Mills in the handling of coal . . . any grade or moisture content.

Bowl Mills have high availability and wide range capacity.

Flexible control of a noiseless and dustless operation with low maintenance is assured.

Widespread application has been made on rotary kilns for Cement, Lime, Dolomite and other products. Kilns provide increased production, superior product quality, lesser fuel costs and maximum burning efficiency with overall operating economy.

These important parts are largely responsible for maintaining the constant, smooth, highly efficient performance of the Mill.

1. The Revolving Bowl directs the coal between the rolls and the grinding ring by centrifugal force, providing maximum grinding efficiency with minimum load of unground material.

2. Tramp Iron, Pyrite, Slate and other foreign materials are automatically and continuously removed from the mill through the Reject Spout.

3. The Journal Assembly has trunnion and spring pressure mechanism for adjustment of grinding pressure between roll and bull ring. The sliding saddle on top plate is adjustable from outside to align roll and compensate for any wear.

4. A precision built Worm Gear Drive that runs in a bath of oil, giving a smooth, quiet, vibrationless operation.

The Bowl Mill is a rigidly constructed, proven machine with a renowned record of performance, backed by an organization with over a half-century of experience in manufacturing pulverizing equipment.

Having a MILL under finger-tip control with day in and day out operation that approaches perfection is practically like having Perpetual Motion.

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COMBUSTION ENGINEERING, INC.

427 W. RANDOLPH ST.
CHICAGO 6, ILLINOIS

Raymond Division

SALES OFFICES IN PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd., Montreal, Canada

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Enter 1283 on Reader Card

How the clam-action 4-in-1 gives you

'equipment spread' utility...

with a one-man "crew"!

Move the "machine action" selector lever—see for yourself how the International Drott 4-in-1 gives you equipment spread utility with a one-man "crew"—does dozens of jobs, other excavator-loaders can't touch! Prove that the 4-in-1 saves you the expense of buying or renting additional machines, and of hiring extra operators. Let your International Drott Distributor demonstrate!

International Harvester Co., Chicago 1, Illinois

Drott Manufacturing Corp. Milwaukee 15, Wisconsin

INTERNATIONAL DROTT

You get a full-capacity, earth rolling bulldozer simply by opening the 4-in-1's clam—with 2-finger hydraulic lever ease. This TD-15 Four-in-One is clearing off brush and removing overburden from a deposit of sub-base materials.

Let the 4-in-1 double for a boom-type shovel in many conditions—as this operator does. Here, his 1⅛ cy. yd. TD-6 Four-in-One applies famous pry-over-shoe break-out action and "doubles for dynamite" to dig hard materials without shooting.

End sticky materials problems for good, the way dredging contractors do: with positive clam-action bottom-dumping. Note how opening the 4-in-1's clam pulls materials from bucket surfaces—and gravity down-pull does the rest—to enforce positive, self-cleanout dumping.

You can back-drag materials wholesale (and safely) from the sand, clay, or gravel bank. And use this same action to grab, carry, and load heavy, unwieldy "impossibles" including stumps, boulders, and slabs of rock—without delay or extra help!

"Our TD-25's *deliver 25%* than the '24's' they

—Tommy Belville, *for Belville Mining Company, Inc.,*

ALTITUDE

more load replace"

Ironton, Ohio

"Our three International TD-25's are delivering 25% additional load, compared with previously-owned TD-24's," reports Belville Mining Company, Inc. "The TD-25 has more power to work at faster speeds without loss of motion.

"Another big advantage of the TD-25, mighty important in outcrop cutting, is you can back it up extreme grades at the faster speeds without changing gears."

"Belville" teams "25's" with a 7-cu yd dragline and a 2½-cu yd stripping shovel—to remove overburden as deep as 60 feet. The tractors are also used to level for the shovels, clean coal, construct roads.

"Live track" power-steering!

Like the TD-24, the TD-25 gives you exclusive "live track" Planet Power-steering—to make full-load, full-power turns, or slam straight ahead with offset loads. With combined on-the-go, HI-Lo power-shifting, you get instant, up-or-down matching of power to condition.

You turn with the dozer fully loaded, without spillage. You get constant-contact benching or highwalling, applying full power, getting full speed. You eliminate "dead-track drag" and "gear-shift lag."

With exclusive new International DT-817 Diesel engine wallop, the "25" bulls along, 230 turbocharged hp strong—without "slow-motion" lug-downs. New TD-25 seven-roller tracks are strength-matched to full engine effort. And the "25" is platformed on super-rugged double-box-beam frames to meet slam-bang conditions!

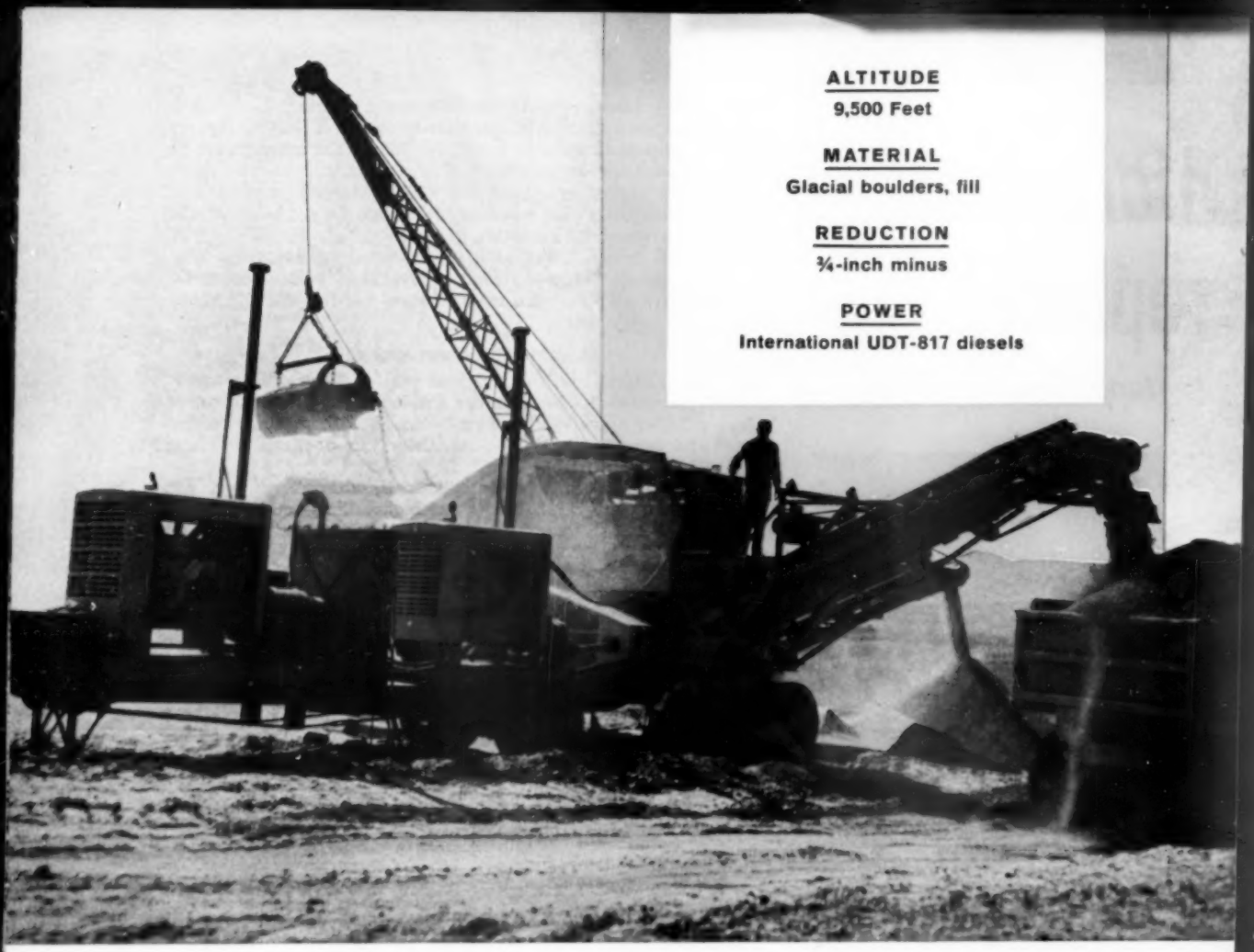
See what it means in extra profits to beat the famous TD-24 by 25% or more. Compare planet-drive "25" ability to outearn king-size clutch-steered rigs by amazing margins—clearing land, blading rock, benching, mass-production overburden removal. Let your International Construction Equipment Distributor demonstrate.

Benching an access road on a 1-to-1, or steeper, mountain slope. The operator of this Belville-owned TD-25 takes maximum advantage of "live track" Planet Power-steering—to gouge out stumps and boulders and cut shale—without "bank-nosing" or sluing. He simply operates the bank-side track in high-speed range, the other in low-speed range—for full-capacity, straight-ahead performance.

International®
Construction
Equipment

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Illinois
A COMPLETE POWER PACKAGE

Two of "Belville's" TD-25's remove up to 50% of the overburden from a coal seam—produce 25% more than the "24's" replaced. Only simplified TD-25 planetary design gives you "live track" power-steering and on-the-go power-shifting.



IH power keeps two draglines busy feeding 300 tons per hour to crusher...

International turbocharger efficiency keeps these rugged diesels operating at full rated power. One UDT-817 powers the Cedar Rapids crusher via direct shaft, and the other provides electric power for conveyors, screens, shakers, etc.

The plant is producing from 200 to 300 tons per hour of ¾-inch minus material, depending on pit conditions. 40% of the glacial deposit material must be crushed. C. L. Hubner Co., of Denver has the contract to supply 125,000 tons of base material, surface stone and hot mix aggregate to repave a section of Colorado 14 and U. S. 40. International power on the big capacity crusher keeps them well ahead of schedule.

Your heaviest crushing jobs can be handled easily by this rugged 385-hp UDT-817 turbocharged diesel. And there are 34 other diesel and carbureted engines in the International line—ranging up from 16.8 max. hp. Check with your International Engine Distributor or Dealer soon and find out how little it costs to power—or repower—your equipment with International.

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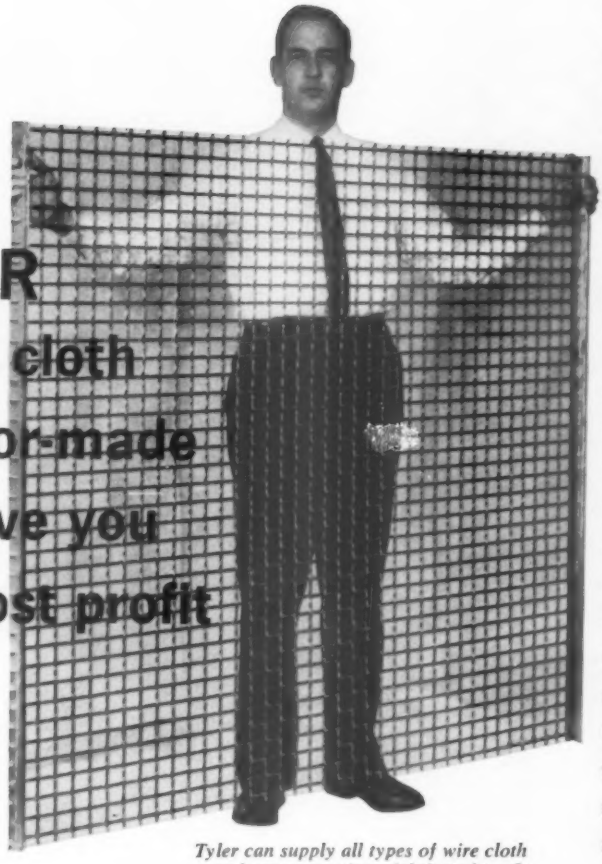
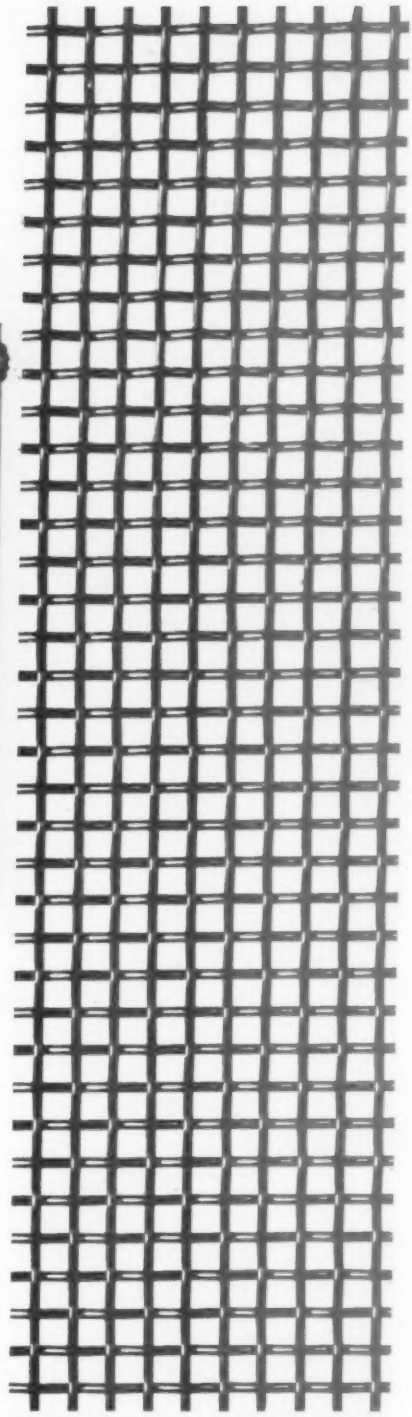


Tyler can supply all types of wire cloth — and screen sections fabricated to fit every existing type of vibrating screen.

Tyler does more than manufacture 53,000 different specifications of wire cloth. It starts by designing the specifications to solve each problem to your greatest profit.

Selection and control of the metal is important—especially where corrosion, abrasion, or contamination are factors. Tyler controls the design of all metals and alloys used in weaving, and in addition operates its own wire mill for processing all its non-ferrous and many of its stainless steel wires. Tyler Screens are literally tailor-made for maximum profit to the user.

Ask your Tyler representative for full information—through him you'll get *Tyler Screening Service.*



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WHAT'S HAPPENING

IN OTHER FIELDS OF INTEREST TO THE ROCK PRODUCTS INDUSTRY

Three immense deposits of lump pumice and of pumicite with excellent pozzolonic properties have been discovered in the Lesser Antilles. Further field and laboratory investigations of the size and quantity of the lodes is of great economic interest. All of the pumice, volcanic cinders and pumicite used in the United States comes from west of the Mississippi. Now the ever-increasing demand for lightweight building materials along the East and Gulf coasts, in Puerto Rico and elsewhere in the Caribbean area, has spurred studies of the islands' potentials for supporting one or more pumice industries. Copies of the report, "Pumice and pozzolan deposits in the Lesser Antilles," by Edwin B. Eckel, are available from the U. S. Geological Survey Library, 1033 General Services Administration Bldg., Washington, D.C.

Cars may have "powder drive" in the future, if research on talcum results in quieter, smoother-riding auto tires. According to M. F. Warner, chemical engineer with Sierra Talc Co., South Pasadena, Calif., talc ground with ultrafine techniques is an effective reinforcing agent for specific synthetic rubbers. Used in a ratio of one part talc to four of carbon black, it gives rubber compositions higher tensile strength and stretchability. It also reduces heat buildup and shrinkage, making it easier to process the product. Practical results include smoother extruded rubber parts and a decrease in mixing and milling costs.

New business hasn't lived up to its expectations, many builders maintain. Projections for plant-and-equipment spending for 1960 were revised downward twice by the Government during the first nine months. Third and fourth-quarter spending was estimated at $36.9 billion, down from the third-quarter projection of a $37.5-billion yearly rate. The full year's total estimate was cut to $36.4 billion from $37 billion. Contractors report keen bidding and higher labor and equipment costs have cut profit margins from 7 percent to around 5 percent on most jobs. Despite these trends, industrial construction reflecting contracts let earlier was 39 percent greater in the first seven months of 1960 than in the like period last year.

Sunrise lights the way to convection as an important factor in making the earth self-cleansing. The air rids itself of pollution most readily shortly after dawn, say researchers at Argonne National Laboratory. Studies of weather's affect on industry-caused pollution were made with radon, a radioactive gas produced naturally by the disintegration of radium atoms in the soil. Experiments showed that radon concentrated close to the ground rises rapidly at this time because of convection caused by ground heating. During clear nights with little wind, cleansing is at a minimum. The slight vertical mixing of air currents holds radon to the ground like a fog. The condition is eased during a day that is both sunny and windy.

A bowling alley in the Green Mountains, started as a testing ground for granite, now has become a dramatic part of space-age development. Two highly polished pieces of the native Vermont rock were used to floor an outdoor alley. It has withstood 40-below-zero temperatures in winter and 90-plus deg. in summer. Makers of jet planes and rockets were quick to adapt the granite to templates in rocket construction where only infinitesimal tolerances are permitted in the flat surfaces. The granite can be polished true and smooth "to be made level within 1/20-millionth of an inch," say officials of the Barre Granite Association.

A new hydraulic invention can cut costs of drilling claims a staff of Jersey Standard Oil Co. researchers. Drill collars costing $18,000 can be replaced with a hydraulic device costing $6,500. Additional savings result from easier handling of the new invention on a rig. Field tests in a well near Snyder, Texas, used a 37-ft.-long hydraulic unit to replace 900 ft. of expensive, hard-to-handle drill collars. The pressure drop across the jet nozzle of a drilling bit is converted hydraulically to apply the weight normally required from drill collars. After each 2 ft. of drilling, it resets itself automatically in about 7 sec. and positions for the next 2 ft. of operation.

Compressed sulfur is stronger than concrete. Southwest Research Institute says that ultimate tensile strength of the former is 160 and ultimate compressive strength is 3,300 psi., compared to 150 and 2,500 psi., respectively, for concrete. The findings have led SRI to consider a vessel made of sulfur which could be towed under water to serve as a transport medium. So far, says Chemical and Engineering News, "It's just an idea."

Fertilizing with liquid phosphorous is a new idea patented by Edgar M. Queeny, chairman of the finance committee of Monsato Chemical Co. Instead of the usual method of allowing phosphorous to burn spontaneously upon contact with air, it injects the chemical directly into the earth in fluid form where it solidifies and slowly combines with oxygen. The equipment described in the patent (No. 2,947,269) can be mounted on or pulled by a tractor. Hot water circulating through a tank jacket keeps the phosphorous liquid until it is discharged through a pipe that moves below the soil behind the cutting blade of a plow.

A tiny, transistorized tape recorder went down a well in southern Oklahoma to get inside information about drilling bits. The $30,000 device, originally designed for guided missiles, was used to check on what happens to a drilling bit deep in the earth where it encounters tremendous pressures. Scientists expect to use the data for developing tougher bits. A good chunk is added to drilling costs by the need to pull up pipe and change bits every 10 or 15 hr.

Just 50 years to go, says the University of Wisconsin, as its researchers start the last half of a 100-yr. test on the strength of concrete. The program, started in 1910, consists of compression and tensile tests made at periodic intervals on aging concrete specimens. Data compiled so far includes: concrete specimens made in 1:2:4 ratios (one part cement, two parts sand and 4 parts crushed stone) and exposed to Wisconsin weather, increased in compressive strength from 1,800 psi. after one month of aging to 5,600 psi. after 50 years.

Reduction ratios are high—power demands low—as the new mechanically simple "Atlas" single-roll crusher provides continuous crushing service.

NEW! PENNSYLVANIA "ATLAS" CRUSHER

offers economical, efficient reduction of shale, soft gypsum, soft limestone, chemicals, etc.

This new "Atlas" crusher is job-engineered for *economy, performance, capacity*—on crushing a variety of materials demanding machine ruggedness somewhat less than required in other crushing operations.

These are compact, powerful, single-roll machines that will give years of trouble-free crushing service at a cost of a fraction of a cent per ton. "Atlas" crushers fit well into production lines. They are built for continuous crushing, and can be started or stopped at any time.

Basically a primary crusher, with its 18, 24 or 30-inch roll diameters handling feeds of 14, 20 and 26 inches respectively, the "Atlas" also serves under many conditions as a secondary crusher.

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With the addition of this new "Atlas", Pennsylvania now offers the widest range of single-roll crushers in the industry—permitting precise job-engineering of the exact machine for each application.

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Full information and operating details on "Atlas" crushers are described in new Bulletin 2025. Send for a free copy today.

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BATH-BUILT

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Here's typical fast Michigan Model 275A loading: two passes of 4½ yd bucket, 40 seconds heap 10 ton truck.

Model 275A bucket-loads average 4.50 yards, 5.85 tons each, per scale-measurement.

Frequent Michigan odd-job: cleanup after blasting. Unit works much faster than crawler-dozer, has added advantage of being able to bucket-lift rock higher than can blade.

Michigans move fast around the quarry, average 18 mph, often hit top of 28 mph.

Here's an unusual but profitable market for LaGace: ¼" stone for ice control. Last year, the company sold over 25,000 tons to airports and highway commissions. Like most limestones, this material contains small percentage of salt. Thus it has advantage of sticking to ice and not rolling off like sand. The result: better traction for airplanes and cars. Some of the material is stored under cover and sold dry; other customers prefer to buy from this open stockpile. The LaGace firm also makes substantial sales to the concrete industry (mostly ¾" to 1½" unwashed stone) . . . asphalt producers (200 mesh) . . . roofers (⅛") . . . paving contractors (½" to 4") . . . and fertilizer plants (5 mesh).

There are, in Quebec, 27 major stone quarries. Almost all of them, 25 to be exact, do their stockpile loading with Michigan Tractor Shovels

The amazing record of one machine at one pit:

416 TRUCKS LOADED IN 8 HOURS!

Production like this certainly *helps* explain the popularity of Michigan Tractor Shovels.

But there are other reasons for this popularity—reasons which *might be of great importance in YOUR profit picture.* As a case in point, let's take ownership in Quebec, Canada.

In Quebec, over 90% of all the major rock quarries use Michigan Tractor Shovels for stockpile loading! This overwhelming preference, this record of buying and rebuying at this location, we feel, is particularly significant. For in Quebec, machines are tested by terrific extremes of *working* temperatures—40° *below* to 110° above. Tonnage demands are increasing rapidly. Distances are great and job sites are often hundreds of miles from repair and maintenance facilities.

Repeat buyer likes Michigan dependability, dealer service

One typical Quebec owner—LaGace Quarries Ltd, Montreal—exemplifies the reasons for Michigan popularity under these conditions. "Michigans usually load faster than other Tractor Shovels," says Paul LaGace. "Hence they produce more. Michigans cause less trouble, mechanically speaking. And when something does go wrong, we get excellent service from our Michigan Distributor (Blackwood-Hodge Ltd) and from Clark Equipment Company."

The LaGace firm reports from long experience. They bought one of the first Michigan Tractor Shovels sold in Canada—a 1¼ yd Model 75A—in 1954. Today, they own six Michigans: the original Model 75A, two Model 175A's equipped with 2¼ yd buckets, and three Model 275A's with 4½ yd buckets.

20 seconds per bucket load

Loading with *any* of these units from *any* of 22 crushed stone stockpiles—4" and run of crusher to lime dust—takes an average of only 20 to 25 seconds per pass, according to company time-study averages. Thus, a skilled operator and a 4½ yd Model 275A regularly heap a 25 ton hauler in five passes, under 2 minutes. A 12 ton tandem-axle truck takes a 275A two passes, 40 to 50 seconds. Top daily load count, so far, for a Model 275A has been an amazing 416 trucks, 10 to 15 tons each, in 8 hours! Production, overall, with the six Michigans loading at LaGace's two pits, has averaged 1,000 to 2,000 tons hourly—over three times as much as before Michigans.

Other jobs: loading shot rock, cleanup after blasting, etc.

The Michigans do a lot of odd jobs too. In emergencies, they have loaded quarry rock. Several of the units often handle cleanup after blasting, dozing and lifting material into high, centrally-located shovel-efficient piles. At times, they clean spillage from haul roads and crusher sites. They tow stalled vehicles. In winter, they plow snow. As Raoul Savage, quarry supt, puts it, "*Whenever we want to lift or haul anything, we just call for one of the Michigans.*"

Good advice! If you *don't have* a Michigan—or if you'd like to see the performance advantages of our *latest models*—call your Michigan Distributor for a demonstration. Pick the size you want to see—nine models, with buckets from 16 cu ft to 10 cu yds, 3,000 to 30,000 lb lift capacities.

Michigan is a registered trademark of

CLARK EQUIPMENT COMPANY
Construction Machinery Division

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2481 Pipestone Road
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Canadian Clark Ltd.
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Michigans help increase production while manpower remains constant. Latest example:

13-ton Tractor Wagon replaces

By replacing three 8-ton dump trucks with one 13-ton Michigan Tractor Wagon, manpower and maintenance expense have been substantially reduced in the stockpiling operation at the Lee Crawford Quarry Co., Cedar Rapids, Iowa.

Lee Crawford, owner-operator of this 250,000 ton per year Florentine limestone quarry and crushing operation, believes in matching equipment to the job. Production has steadily increased since he started "from scratch" 14 years ago, even though for the past 8 years his crew of eight men has remained the same. He has been able to do this by increasing equipment capacity and efficiency.

Michigan Tractor Shovel replaces swing shovel, portable conveyor

Five years ago his first Michigan machine was purchased . . . a Model 75A Tractor Shovel which replaced both a swing shovel and a portable conveyor. This permitted reassignment of one man for work in another part of the quarry. The unit handles *all truck loading* at the stockpile. It also grades haul roads and unloads equipment from trucks.

The economical and efficient operation of the Tractor Shovel proved so gratifying that when it came time to replace three dump trucks used to haul from crusher to stockpile, Owner Crawford decided to see what else the Michigan line had to offer. He called in Michigan Distributor, Spreitzer Inc., from Cedar Rapids.

Stopwatch demonstration proves speed and capacity

After discussing his needs, the Distributor brought out a 13-ton Model 110 Tractor Wagon. On a typical cycle, the Michigan loaded 3-inch stone at the crusher bin, traveled 400 ft to the stockpile, made a 90-degree turn, backed 100 ft up a 17 percent adverse grade, unloaded *over the edge* of the stockpile, and returned 500 ft to the bin—all in less than 2 minutes. Average speed for traveling, backing and accelerating was 9½ mph. Similar results were obtained on runs to all four stockpiles.

It was evident that one man and the one Tractor Wagon could do more work than three men with the three dump trucks. This was the kind of production Mr Crawford was looking for. The Michigan stayed. Two of the truck drivers were reassigned jobs in other quarry operations. Thus, manpower in the stockpiling operation was

Michigan, by dumping over edge of bank, eliminates need for dozer cleanup.

During free time from stockpiling, Michigan hauls shot rock.

Big top-opening speeds loading of crushed stone.

Capacity and efficiency of Michigans, as proved by five years experience with this Tractor Shovel, triggered purchase of the 13-ton Tractor Wagon.

three 8-ton dump trucks

cut by ⅔. Maintenance, too, was reduced from three machines to one.

Stockpiles 2,500 tons per 7½ hour day

Today, a typical 7½ hour shift calls for 24 trips per hour from crusher bins to stockpiles. Distances vary. Maximum round trip cycle is 1400 feet. Average is 600 feet, with good cycle time figured at 1 minute and 20 seconds. Hauling in excess of 13 tons per load, production amounts to about 2,500 tons per day. The Michigan is scheduled to keep all stockpiles at an operating level of 30,000 tons. Normally it can do this and still have time to assist in other areas of the quarry.

Hauls shot rock, too

Naturally, the 162 hp Model 110 is right at home in the quarry pit too. Here it frequently helps two conventional off-the-road dump trucks haul shot rock to the crusher. It accelerates fast . . . also has the major advantage, because of the rolling action of its big low-pressure tires, of reducing haul road maintenance.

Truck problems eliminated; so is need for dozer cleanup

"Another major Michigan advantage," says Mr Crawford, "is its ruggedness. Our trucks were being beaten to death on this work. We've had lime piles 50 ft high with grades the trucks just couldn't pull, not to speak of frame distortion and all its complications. This has all been eliminated by changing to the Michigan. Also, the Tractor Wagon's ability to dump over the edge of the stockpile has done away with the part-time need of another machine to push the material over. The Michigan is a good example of what I mean by matching equipment to the job."

Get all the facts

Like to see how a high-speed rear-dump Michigan Tractor Wagon can be matched to *your* job? Then call your Michigan Distributor for all the facts. He has two model Tractor Wagons to choose from—13 ton and 25 ton capacities.

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EDITORIAL

by GEORGE C. LINDSAY

"Say it where it counts"

EVERYONE'S INTERESTED—OR SHOULD BE—in better company-employe relations. So's a friend we talked with the other day. He thought he was doing a bang-up job on the subject, until he got proof that he wasn't.

Bill's trouble was that some of his employes didn't really understand the importance of their job to the business, and they weren't sure of the company's status in the industry. These facts were important to those employes, but no one had bothered to tell them.

This seems unimportant to some, and that's where Bill made his mistake. He learned, after he'd lost a valuable employe, that the worker was more interested in his job and his company than the boss realized.

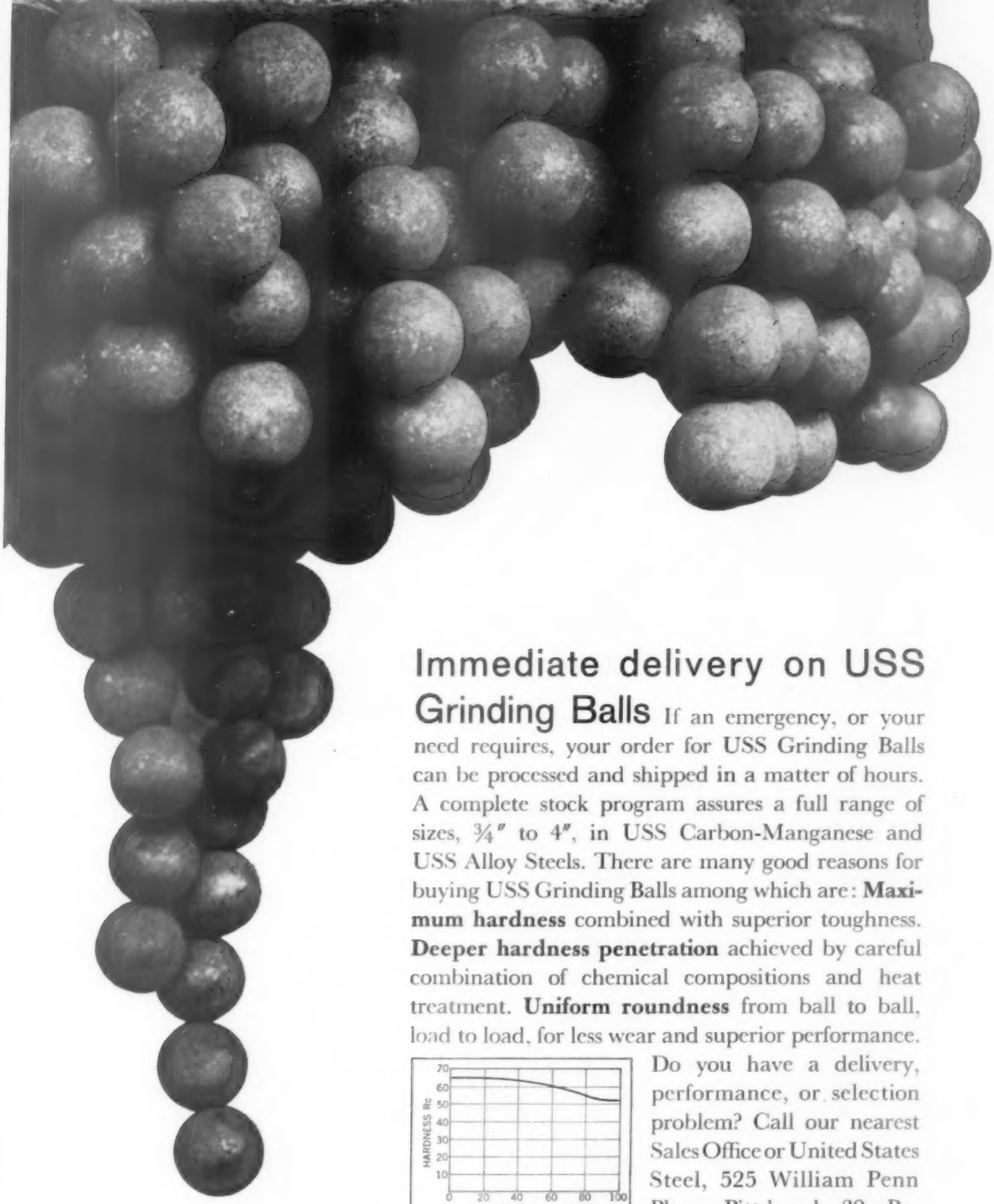
Three facts show up in this case: (1) failure to recognize employe interest, (2) failure to know the importance of communications and (3) failure to communicate.

Loss of a good employe naturally was followed by Bill's wish to do something about this vacuum in his organization. Now he has a good program of information service between management and employes. He plans to let them know, regularly, how his company works, what it invests, what it spends, how it serves—in addition to the operating and other company policies that Bill has used to make his company a success.

A recent publication from a company in our own field illustrates this point well. The New York Trap Rock Corp. issued a printed sheet pointing out the fact that the company's investment in its business amounted to a whopping $40,000 per employe. Can't you imagine how much more importance each employe, knowing this, now places on his own job and on his company? Particularly since management pointed out that the above amount compared with an average of $20,900 for the 100 largest manufacturing companies in the country?

You can follow suit with good results, if you're not now doing so. Get such information together and pass it around to your own employes. Tell them, as New York Trap Rock did, what's behind each job in the company. Explain to them how they're sharing in the benefits of good operation—making quality products at a low price. Encourage them, with information, to realize that they're helping to make the company the best in the business.

"Say it where it counts," as the adage goes. Your employes will like it, you'll like it, and we'll bet you'll reap mutual benefits.



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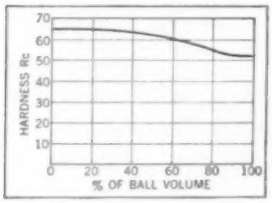

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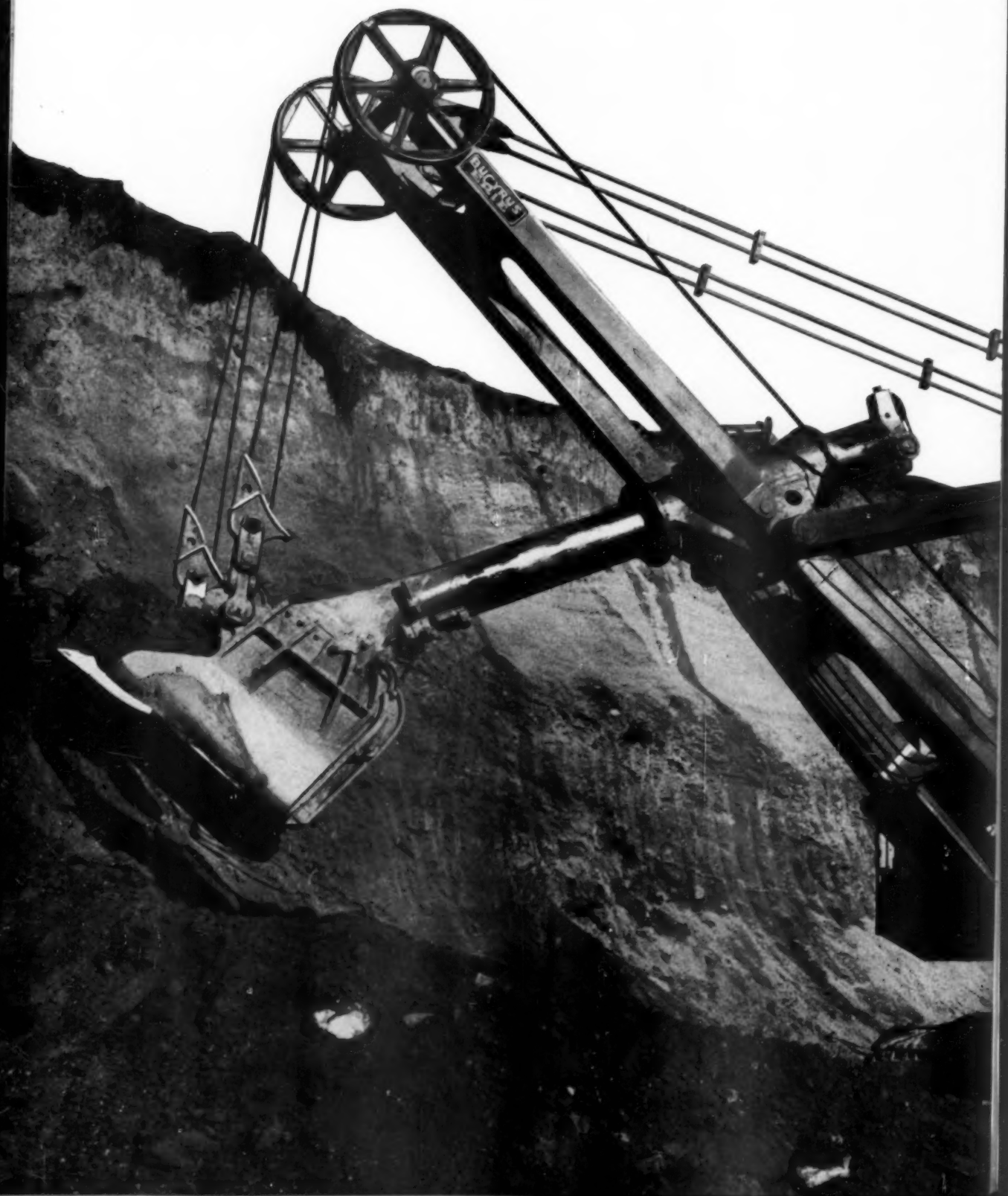

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SPECIFICALLY, with this new Bucyrus-Erie control there's no excessive heat loss, even in stall conditions. In tough digging, torque is increased, speed reduced — you move on through the digging cycle!

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CROWD MACHINERY is mounted on the revolving frame, not on the boom. Weight works for you without robbing front-end output. Digging ranges are greater than other electrics or diesels in same size bracket!

GET THE FACTS on this new modern electric control you'll find *only* in Bucyrus-Erie electric excavators. Write Bucyrus-Erie Company, South Milwaukee, Wis.

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ROCKY'S NOTES

by NATHAN C. ROCKWOOD

Success story told with candor

THE NATIONAL GYPSUM CO., Buffalo, N.Y., has published and distributed to stockholders and other interested persons a paper-bound book of 142 pages entitled "Design for Growth." It is "the story of the company in commemoration of its 35th anniversary," written by Dean Richmond, a local newspaperman, with an introduction by Bruce Barton, of advertising agency fame. The author begins his narrative: "Here is a true story of an industrial romance of legendary proportions," and it really is.

While much of the contents read more like a prospectus for the sale of securities than an historical narrative, they do contain much helpful material on how to achieve success in any industry—and these implied instructions or suggestions are based on "a living example," and not on some theorist's momentous deductions. The author says: "The files of the company were made available to me, and I was given a free hand to write the story of the company as I saw it."

That, in our opinion, is one key to National Gypsum's success. It has always believed in full publicity about its operations. It was that policy which early endeared it to us (here meaning ROCK PRODUCTS as an institution). For when this writer started to edit the journal, it was extremely difficult to get much information on many operations in these industries, particularly portland cement and gypsum plaster or stucco. Know-how was regarded as a secret that must be preserved at all costs. The gypsum industry was especially difficult because three-quarters of the production was in the hands of one company whose conservatism was notorious.

So, when National Gypsum started operations, we made it a point to become acquainted with the officers as soon as possible. And, glory be, they were so friendly and hospitable. They gave us permission to see and write as much as we could absorb. We never have forgotten our interview with Joseph F. Haggerty, the first president and one of the three founders. The other two were Clarence E. Williams and Melvin H. Baker. From his looks and mannerisms Joe Haggerty might well have been an Irish poet, an artist or other kind of intellectual, rather than the daring and aggressive industrialist that he was—in all events a scholar.

With that background, we appreciate the author's reference to an incident recited near the close of his narrative. He describes Mel Baker, chairman of the board, reaching into a file of papers in his desk drawer and picking out "an obviously time-worn, ragged-edged sheaf of papers." This was to answer the question of how Mr. Baker defined the "corporate image" of his company. "I think I've got what you're looking for," he remarked. "It's an address I read at our first sales convention back in January, 1927," and the chairman said with an air of pride tinged with humility, "Joe Haggerty wrote it." And the chairman assured his interviewer that the ideals recited in this address have been followed ever since.

Joe Haggerty had thus defined the success he and his associates sought: "The successful business must make profits. The expansion of its finances is dependent upon a good profit showing, but there are businesses making profits that are not successful because they lack the good will of their trade and their organization, and must eventually pay the price. The real successful business, in my opinion, seeks not alone at the start, but ever and always, the good will of its trade, its employes and its investors. It never considers any one interest divorced from the others, but rather as each having a vital place in the building of the company." That spelled out in detail has been the practice of the organization.

Starting with a single gypsum products plant in 1925 and $774,197 in assets, the company made its first profit of $35,855 in 1926, with year-end

Please turn to page 118

TELSMITH® *designed* for extreme flexibility with a wide variety of products

TELSMITH EQUIPMENT in this plant has two circuits: one with 24″ x 5′ Plate Feeder, 4′ x 10′ 2-deck Scalper, 4′ x 12′ 3-deck Vibro-King wet screen, 20″ x 15′ Twin Screw Classifier for concrete sand, 48″ x 30′ Sand Drag for mason sand. Gravel circuit has 10″ x 30″ Jaw Primary Crusher, 4′ x 10′ 1-deck Vibro-King dry sizing screen, 36-FC Gyrasphere Secondary Crusher, and a second 4′ x 12′ 3-deck Vibro-King wet screen.

This plant was tailor-made by Telsmith to produce aggregates for its owner's bituminous concrete plant, and for commercial use in the area. Products are Pennsylvania Highway Dept. specs Nos. 3A, 2A, 2B, 1B, Class A concrete sand, mason sand, and asphalt sand. In addition, minus 1″ and minus ½″ round gravel may be extracted and blended into final product either crushed or uncrushed when making crushed concrete specs. Plant capacity is 100-125 tph. Plant was designed and its Telsmith equipment supplied by A. R. Amos Co., Telsmith distributor, Philadelphia, Pa.

Send for Bulletin 266.

G-33-960

▲ **Keystone Pavement & Construction Co. Lake Ariel, Pa. plant (general view).**

◀ **24″ x 5′ Plate Feeder, 4′ x 10′ 2-deck dry Scalper, 10″ x 30″ Jaw Primary Crusher.**

◀ **4′ x 10′ 1-deck Vibro-King sizer screen and 36-FC Gyrasphere Secondary Crusher.**

▼ **Two 4′ x 12′ 3-deck Vibro-King wet screens, 20″ x 15′ Twin Screw Classifier, 48″ x 30′ Sand Drag.**

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On-the-job performance of the Model H-120 proves it far more

productive

because it has more power, better balance, longer reach and more dumping height than any tractor-shovel in its class

Productive capacity and performance are the true measures of any machine, and the 4¼-yard Model H-120 excels on both counts. Hough's greater experience and "know how" in tractor-shovel engineering was never more apparent than in the design of this big PAYLOADER.

The Model H-120 has 300 horsepower – more than any other machine in this category. Maximum tractive and hydraulics demands are handled simultaneously without "lugging down." The H-120 has a higher horsepower-to-weight ratio – as much as 30% more than other machines in its size range – because a lot of useless dead weight has been eliminated.

The H-120 has more dumping clearance, and more dumping reach, than comparable units. It loads big trucks and railroad cars more evenly and easier – can stockpile higher.

The H-120 has better balance and stability because of the exclusive use of extra-strong "T-1" steel for box section boom arms that saves over a ton of dead weight on the load-carrying end. The approved and exclusive use of dry ballast material in the rear tires lowers the center of gravity with 50% of the weight below the rear axle.

The H-120 has a separate oil-cooling radiator that is fan-cooled. This exclusive feature provides effective cooling of the transmission-torque converter oil even in hot climates.

The H-120 is even easier to drive than smaller tractor-shovels, say the operators, because of power air-brakes, power-steer, power-shift, and unusual visibility.

The H-120 has a distinctive boom design, forward and clear of the operator for greater safety. It features a single bucket-tilting ram and high-leverage linkage with a tremendous breakout force. Another big advantage is simplicity and fewer parts, reducing wear and maintenance.

The H-120 has a Hough-built full power-shift transmission of advanced design. It is a full reversing, constant-mesh type providing 4 gear ratios in each direction. All four gear changes are made with one lever and *without stopping* for a "range" shift.

The H-120 has "Operators-Choice" brake control — exclusive in its class. Dual pedals permit the operator to brake with or without the transmission engaged, as desired for any operating situation. The large-capacity 4-wheel air brakes contribute greatly to the easy, safe handling of the machine.

The H-120 has special protection throughout to promote long life and reduce maintenance of the engine, drive train and hydraulic systems. A special dry-type, two-step, engine air cleaner gives 99.8% dust-removal efficiency under the most adverse conditions. The hydraulic system is sealed and pressure-controlled to keep out air-borne dirt, and also protected by an exclusive system of cartridge-type filter and fine mesh screens.

The H-120 is provided with canopy-type cab, windshield wipers and special lights as standard equipment. Bucket sizes are available from 3¾ to 8 cu. yd. (S.A.E. rated). The exclusive 4 cu. yd. Drott 4-in-1 bucket can also be supplied.

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705 Sunnyside Ave., Libertyville, Ill.

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Company_____

Street_____

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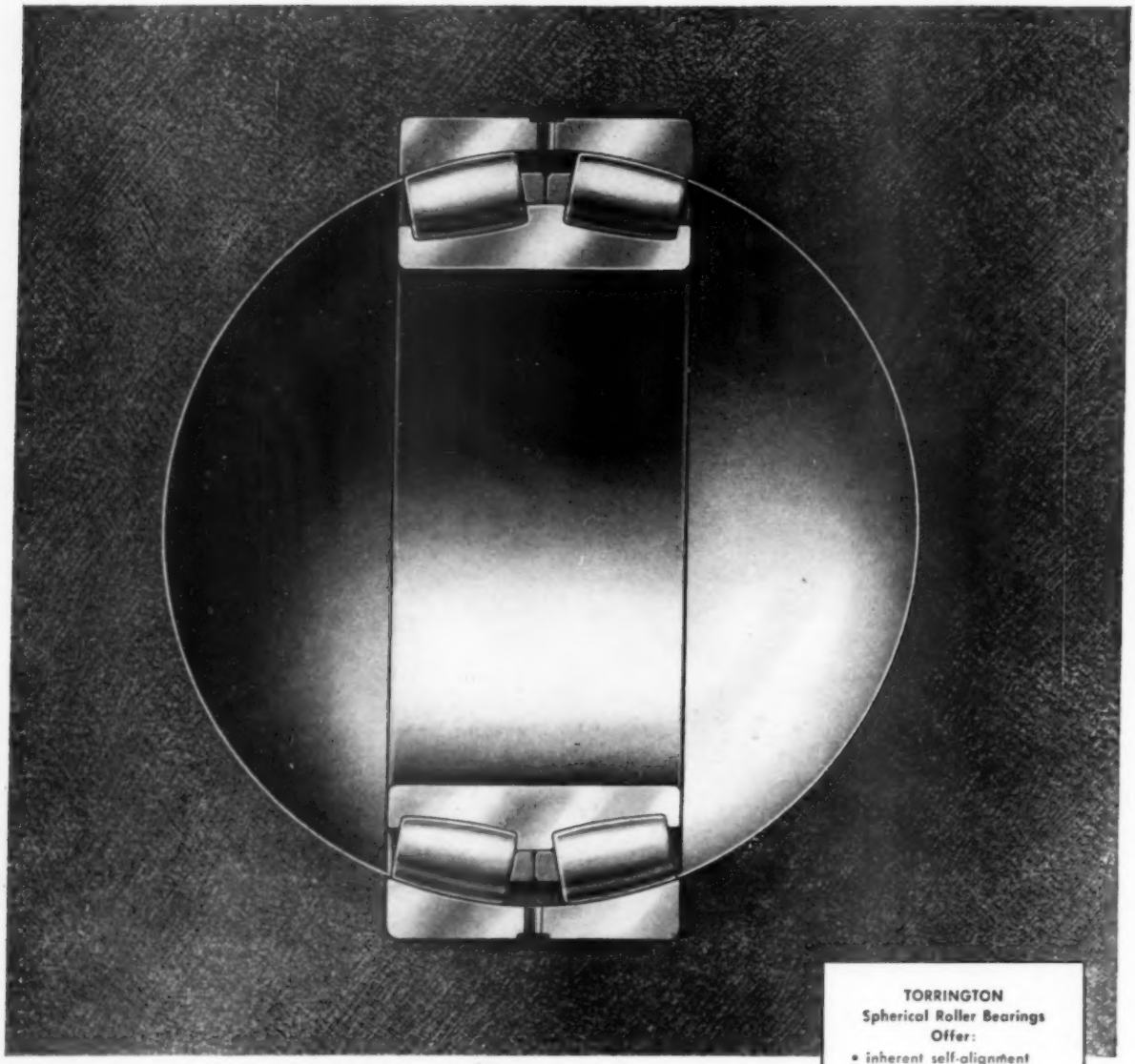

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If you're looking for outstanding bearing performance and bearing *value*, you should specify Torrington Spherical Roller Bearings. Backed by Torrington's uncompromising experience in engineering and manufacturing every basic type of anti-friction bearing, their quality is unmatched.

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- positive roller guidance
- land-riding bronze cages
- maximum radial and thrust capacity
- controlled internal clearance
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- even load distribution
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WASHINGTON LETTER

by EDGAR POE

Large light Rock deposits Is reported

A Geological Survey report to the International Cooperation Administration describes three very large deposits of pumiceous material on islands of the Lesser Antilles. The deposits described are on Dominica (The West Indies Federation), Martinique (France), and St. Eustatius (Netherlands). Other and somewhat less promising deposits of pumice, pumicite, volcanic cinders and pozzolanic earths are known on these and several other islands of the Antilles.

Pumice, an extremely light, frothy rock ejected by volcanoes, is widely used as an abrasive and for other purposes, but its greatest use is as an aggregate for "cinder" block and other strong but lightweight concrete masonry products. Pumicite, the very fine grained equivalent of pumice, is likewise used widely as an abrasive, for acoustical plasters, and many other products. Large quantities are used in Europe for pozzolan cements; the demand for pozzolans in the United States is barely in its infancy.

All the pumice, volcanic cinders and pumicite produced in the United States come from west of the Mississippi. No deposits are known in the East, though the demand for lightweight building materials along the East and Gulf coasts, as well as in Puerto Rico and elsewhere in the Caribbean area itself, is ever-increasing. The presence of large and easily mined pumice deposits, close to sea transportation and within easy shipping distance of many potential markets, is regarded at the Interior Department of considerable economic interest.

Government Family fights Break out

Businessmen's confidential reports to the Bureau of the Census could be used against them in anti-trust prosecution cases by the government if the Federal Trade Commission has its way. The FTC is appealing to the Supreme Court for assistance in an effort to win the right to use information on the secret census forms against the firms which file them. The nation's highest tribunal will take up the question later this year.

The issue has created an unusual family fight within the government. Census Bureau officials and the Bureau of the Budget are fighting the move. Anti-trust officials at the Department of Justice are supporting the FTC.

If the FTC and anti-trusters get their way they will have access to Census reports filed by every interstate corporation in the United States. And they will use the information to prosecute anti-merger cases. The report contains information on the share of the market held by corporations.

The Census takers contend the reports are complete only because they are confidential. They maintain with substance that removal of the secret files and making them available to the Federal Trade Commission will harm the business Census programs.

Stricter Regulations Are needed

Federal intervention in traffic safety activities of the states is a possibility if local authorities continue their assertedly present "indifferences and lack of positive action to reduce traffic fatalities," according to FBI Director J. Edgar Hoover. Hoover declares that lack of local interest has "brought on considerable indifference to enforcement of existing traffic laws and the need for stricter regulations" is one of the major drawbacks to improvements on the local level.

Billion and Half in road Construction

Federal aid highway construction contracts awarded by the State Highway Department the first-half of 1960 totaled 3,762 and involved an outlay of $1.5 billion, the Bureau of Public Roads says. Average cost of each contract was about $400,000, but varied from less than $25,000 to nearly $15,000,000.

There is now approximately 9,200 miles of the proposed 41,000-mile interstate road system open for traffic. Since the inauguration of the construction of the interstate system four years ago about $9 billion has been spent on the divided, multi-laned, stop-light free highways.

New manual On soils use Is off press

The Bureau of Reclamation has published a new edition of its "Earth Manual," a successor to the June 1951 edition. The manual, written by Bureau specialists in the field of soil mechanics, has received worldwide use by water resource organizations, public agencies and private engineers.

The new edition provides current technical information relating to field and laboratory investigations of soils used as foundations and materials for dams, canals and many other types of structures built on Reclamation projects in the United States.

The Bureau's many years of experience in investigating and testing the various properties of soils relating to engineering uses is incorporated in the new publication. Chapter I of the Earth Manual describes the Unified Soil Classification System developed jointly by the Bureau of Reclamation and the Army Corps of Engineers. Chapter II covers investigations of soils, and Chapter III presents information on the control of construction from the soils standpoint, for both foundation treatment and compaction control of fills.

The preface states, "Separate sections are devoted to problems of rolled earth dams, canals, and miscellaneous construction features. For each of these, information on design features and usual specifications provisions are given to provide control personnel with a background to assist in implementing the recommended control techniques."

Public roads Answers GAO Criticism

The Bureau of Public Roads apparently has satisfied the General Accounting Office regarding permission to use consulting engineers in connection with the accelerated highway construction program. Most of the states have been employing private consulting engineers to accomplish design of the highways.

The General Accounting Office last year was critical of the Bureau for allowing the states to use federal funds to pay out substantial fees to the consultants. Under the Interstate System, the federal government puts up 90 percent of the cost of the roads, and the states the remaining 10 percent. However, the states must maintain the highways, which is going to be an expensive item for them.

Public Roads declared in a report to the General Accounting Office that the accelerated program authorized under the 1956 Federal Aid Highway Act could not have gotten off the ground if consulting engineers had not been used in many states. Furthermore, Public Roads emphatically disagreed with GAO that use of consulting engineers had increased costs.

"In many instances," said the Bureau of Public Roads in its reply to the General Accounting Office, "it has made available to highway departments experts in various phases of highway engineering, particular in urban areas that would be impossible to otherwise obtain.

"Public Roads will continue to require the states to have adequate highway departments. The use of private engineering organizations to help the states build up plans ahead of their construction program will result in more orderly and better right-of-way acquisition. Use of consulting engineers for some of the work gives the states greater flexibility; enables them to secure more experts for specialized problems particularly in urban areas; brings fresh, unbiased thinking into solving problems . . . and enables work to be accomplished that would be impossible otherwise . . ."

New Hoffa Contract may Bring probe

Teamsters' Boss James R. Hoffa's new contract with 1,500 Eastern truckers may touch off some Washington investigations. Senator John L. McClellan, Chairman of the Senate Rackets Committee, asked his staff to conduct a preliminary inquiry into the contract.

Reports that the new contract bears a clause aimed at flaunting prohibitions of the Landrum-Griffin Labor Reform Act against hot cargo and secondary boycott agreements are under particular study.

Besides a possible Congressional inquiry into the contract, the dispute clause will probably be tested before the National Labor Relations Board the first time it is put into effect. It could wind up before the United States Supreme Court should Congress fail to amend the law closing loopholes that Hoffa may have discovered in the 1959 law.

IRS declines To exempt Electric car

Internal Revenue Service officials have refused to exempt a new small electric car from the manufacturers excise tax although it has limited speed and range.

"The fact that it is impractical to use on freeways or main highways does not characterize it as a 'non-highway vehicle' for tax purposes," the IRS says.

The car is 9 ft. long, 3 ft. wide, and weighs about 800 lb. It is designed for use on streets where traffic is light, and has a maximum speed of 30 miles per hour.

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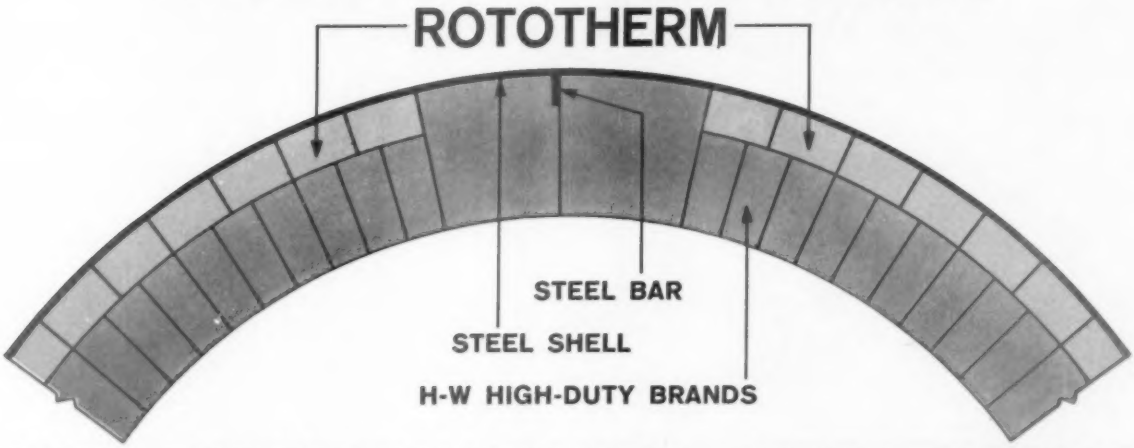
Effective! Economical!



WITH HARBISON-WALKER REFRACTORIES

ROTOTHERM, the strong lightweight brick singular in its combination of properties which are particularly suited for the insulation between rotary kiln shells and hard refractory brick linings. Most significant among these desirable qualities is its characteristic of slight surface compressibility with unusual resistance to pressure rubbing. Although ROTOTHERM is strong, it is not brittle and when subjected to pressure and abrasive action in kiln linings, the surface in contact with the hard refractory brick tends to compress very slightly rather than abrade away.

The momentum and inertia which occurs on stopping and starting rotation of a kiln is accompanied by slippage tendency and friction—causing abrasion. It is this factor which ROTOTHERM satisfactorily withstands.

This property is illustrated by the following simple test:

Brick were held together opposite each other with equal bearing against a revolving steel ball. Depressions illustrate relative resistance to pressure rubbing.

OTHER PROPERTIES OF MAJOR IMPORTANCE FOR THIS APPLICATION:

TEMPERATURE LIMIT	1600°F.
DENSITY—AVE.	51 P.C.F.
COLD CRUSHING STRENGTH	1400 P.S.I.

Relative insulating value of ROTOTHERM—3″ equals approximately 12″ of dense fireclay brick.

Years of gratifying experience with ROTOTHERM in this use of insulating rotary kilns provide the most dependable criteria of its durability and economical use. Write for further details.

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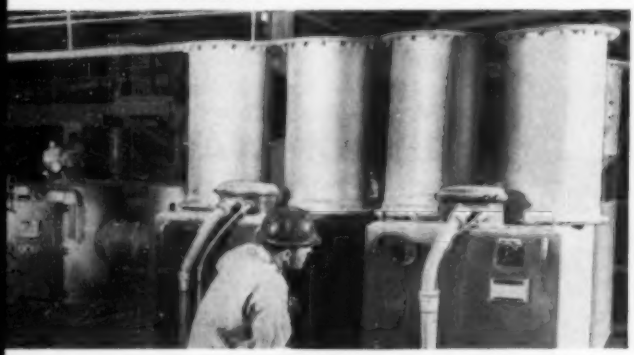
Modern in every respect . . . Dundee selects General Electric to power unparalleled initial production of 6 million barrels annually.

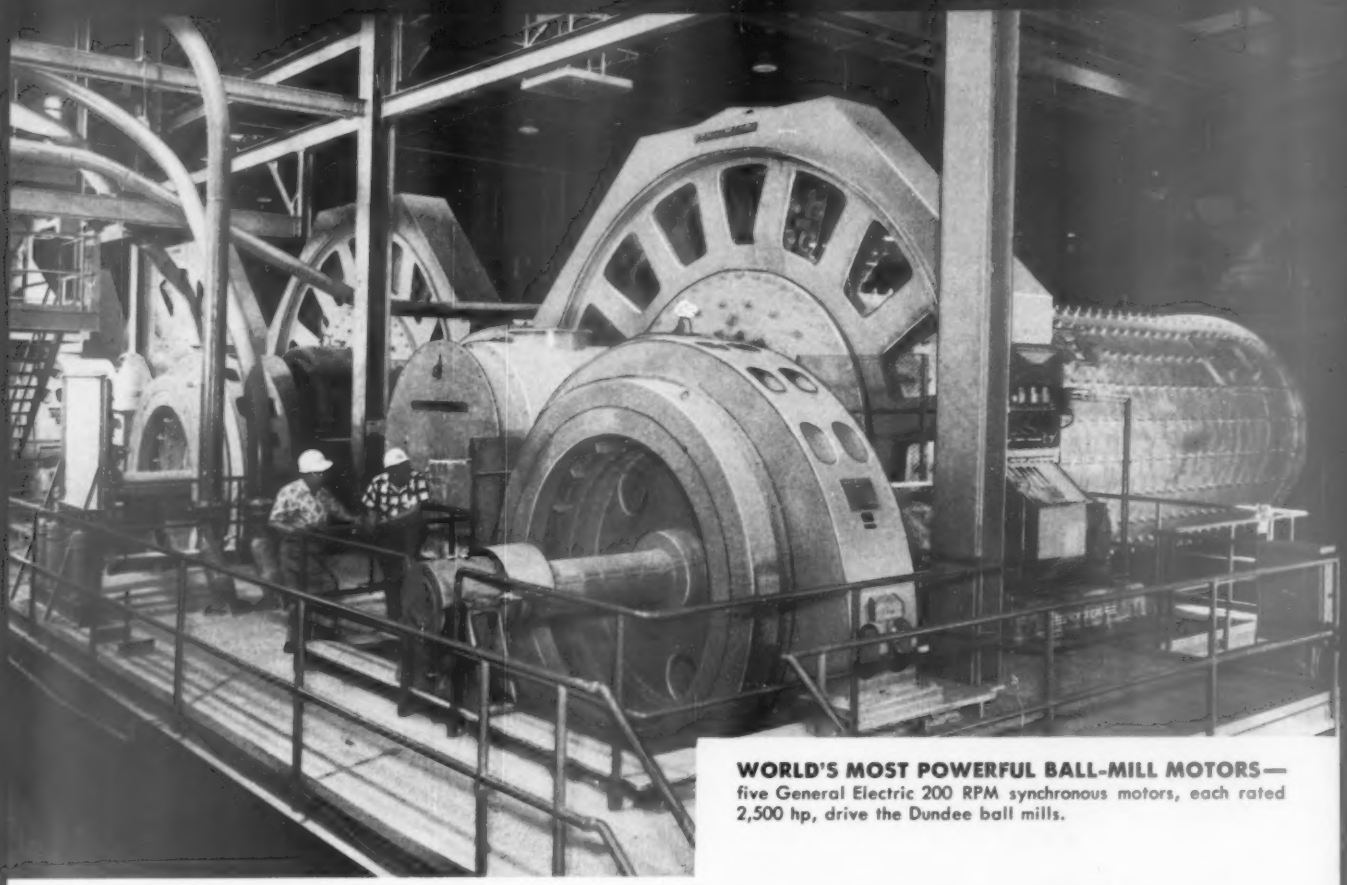
BEHIND-THE-SCENES—G-E Limitamp* equipment consisting of isolator switches, spotting panel and field control panels, supports the five 2,500-hp raw and finish grinding mill motors.

NO DUST PROBLEMS—dust control means increased profits, happy neighbors. General Electric high-voltage silicon rectifier power supply is a vital link in the operation of Dundee's electrostatic dust precipitators.



Planned and built to meet the needs of a present—and expanding—cement market, Dundee Cement Company's new plant at Dundee, Mich., has received the attention of leaders in the cement industry throughout the world. And well it might. For Dundee Cement enjoys the enviable distinction of being able to more than double its initial production capacity of 6 million barrels per year, at any point in time, without enlarging plant structures. It's no "secret" that thorough planning resulted in a practical and economical plant layout . . . this saves dollars. Built for volume, the $25 million Dundee plant also enjoys the distinction of being one of the world's most economically constructed cement plants . . . slightly less than $5 per barrel construction cost.

Small wonder then that, in planning the most modern plant of its kind in the world—largest start-up capacity, world's largest grinding mills, largest kilns on this continent, Dundee's designers looked to General Electric to provide reliable power vitally necessary for such a highly mechanized facility. Working in cooperation with Dundee and the engineering department of the St. Lawrence Cement Co., Clarkson, Ontario, General Electric supplied apparatus including switchgear, motor control centers, 5 of the most



WORLD'S MOST POWERFUL BALL-MILL MOTORS—five General Electric 200 RPM synchronous motors, each rated 2,500 hp, drive the Dundee ball mills.

powerful ball-mill motors in the world, each rated 2,500 hp, and more than 250 induction and other motors ranging up to 800 horsepower—all to provide integrated and reliable power, from quarry to storage silos.

Dundee Cement and other leading producers of Portland Cement in the United States look to General Electric for the electrical apparatus systems so necessary in this age of highly mechanized cement production.

If you are planning to expand or modernize existing facilities, or to build new processing plants . . . you'll be dollars ahead to call on General Electric. Experienced G-E application engineers—familiar with electrical requirements of the cement industry—will gladly assist you or your engineering consultants in providing the electrical systems tailored to meet your own specific needs. For immediate information, call your nearest General Electric Sales Engineer, or write direct to General Electric Company, Section 658-25, Schenectady 5, New York.

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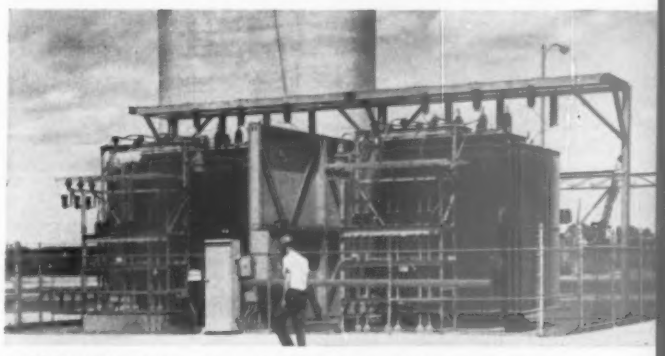
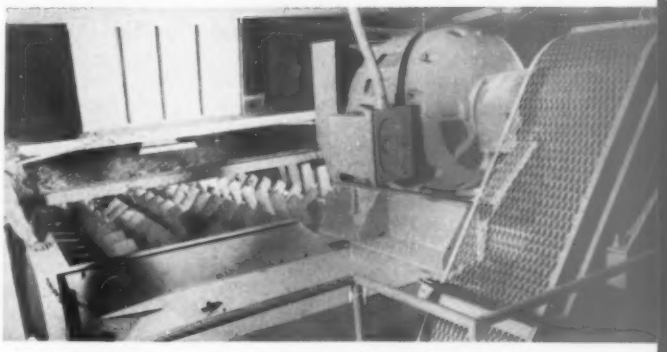


INCOMING POWER—Detroit Edison generated power enters Dundee through these G-E substation transformers supplying 4800-volt, 3-phase, 60-cycle power to plant operations.

RUGGED DUTY REQUIRED HERE—years of reliable trouble-free operation of this clay preparation log washer is assured, thanks to the 600-hp G-E squirrel-cage motor.



LABOR RELATIONS

A ROUNDUP OF ACTUAL DAY-TO-DAY IN-PLANT PROBLEMS AND HOW THEY WERE HANDLED BY MANAGEMENT MEN

How would you decide?

Who should get fired when employes go out on a wildcat strike?

What Happened: The company had a problem. Employes were taking advantage of the coffee break. They were returning to their jobs late.

Arthur Swiggart was twice warned about this kind of lateness. When it happened again he was given a one-day suspension. He showed up early the next morning and collared two fellow-employes to whom he complained about his treatment by management. Swiggart couldn't get into the plant because he was on suspension—but he took a stand outside and harangued the workers going into the plant.

In the meantime, his two buddies went into the department, and walked up and down the aisles talking and waving their hands. In half an hour the department was empty—the employes had walked off the job. The next day five workers were fired.

They all demanded reinstatement at arbitration. Swiggart claimed that he couldn't be held responsible for the illegal walkout because he wasn't even in the plant when all this happened. His two pals maintained that they were really trying to restore order and not creating a situation—let alone instigating a strike. The remaining two workers who were discharged admitted walking out, but they maintained that they were simply following the group and should not be singled out for punishment.

The company argued that a wildcat strike is illegal and that all or any participants can be punished as the company sees fit.

Were the workers:
Right? ☐ **Wrong?** ☐

What Arbitrator Teple ruled: "The action taken by the employes was both improper and ill-advised. No matter how touchy the subject of the relief breaks have become, the matter was clearly one to be handled in an orderly manner under the grievance procedure. Provisions for the handling of grievances embody one of the most significant developments in the field of labor-management relations. They are designed primarily for the benefit and protection of the employes. If they are not utilized, the whole system is weakened and endangered. Having achieved this highly important protection, it behooves the workers to honor and uphold their end—and not to ignore the express provisions agreed to in the collective-bargaining process whenever the thoughtless spirit of the moment dictates.

"Where employes have been guilty of improper action of this sort, in direct violation of a no-strike provision, the great majority of decisions hold that the employer is justified in imposing the discharge penalty. However, the employer is not considered free to pick and choose indiscriminately those who are to be penalized—while granting amnesty to others guilty of the same improper action. If the employer chooses to reinstate some, he must normally extend the same opportunity to all.

"If there is evidence that particular employes have incited, instigated or led the others in taking improper strike action, the leaders of a wildcat strike are subject to greater censure. Applying these principles, it is the conclusion of the Arbitrator that the action of the company was justified against Swiggart and his two companions. The other two must be reinstated as they were not guilty of instigating the strike but only joined others in leaving their jobs. They cannot be singled out."

If a holiday comes while an employe is on layoff for misconduct, should he get paid?

What Happened: The company had a policy of paying for certain holidays, but only if the employe showed up the day before and the day after. Jim Zelock was on layoff for 2 days because he was guilty of certain misconduct. His layoff ended on the day a paid holiday fell due. He wasn't paid.

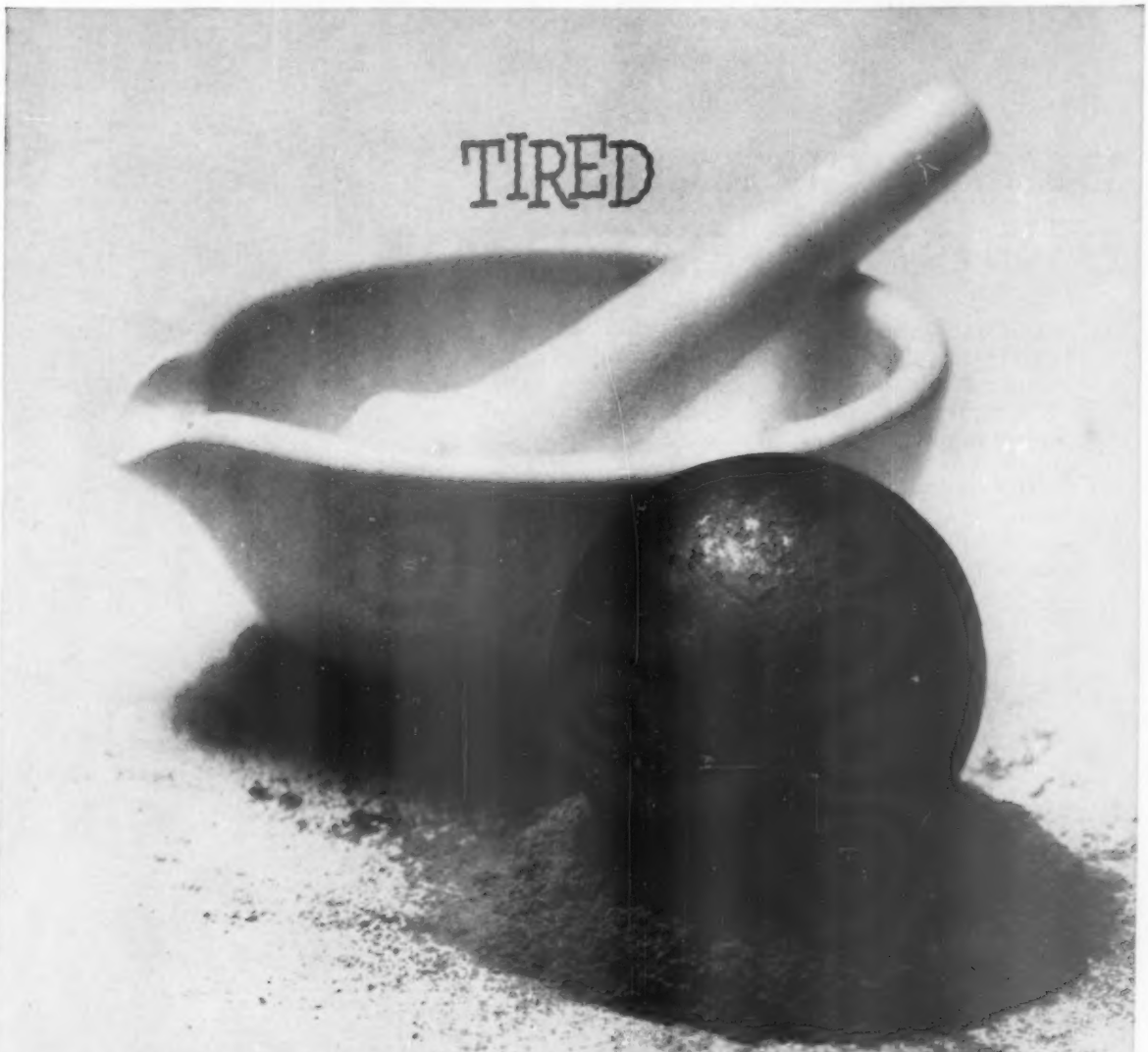
He admitted that he didn't work the day before the holiday. "But that wasn't my fault. I was told by the company not to come to work because I was being disciplined. So it was management's fault that I didn't show up."

"Not our fault at all," answered the company. "You were responsible for the misconduct that resulted in the disciplinary layoff. So don't blame us."

Was the company:
Right? ☐ **Wrong?** ☐

What Arbitrator Anderson ruled: "The policy of requiring employes to work the last scheduled workday before and after the holiday in order to be eligible for holiday pay has been inserted in collective-bargaining agreements in order to discourage voluntary absenteeism on the part of employes. In the case of a disciplinary layoff, the employe's absenteeism cannot be considered as being of his own volition. Therefore, we have the question of whether the employer can add to the disciplinary penalty of layoff the loss of holiday pay, thus stretching the discipline from a 2-day layoff to a 2-day layoff plus loss of holiday pay. This would not be equitable. James Zelock shall be paid for the holiday."

END



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Coates Grinding Balls grind better, last longer and wear more evenly because they are carefully made of special formula fine-grained, high-carbon steel, checked and calibrated to be more perfectly round . . . scientifically heat treated to the very core, to be tough and rugged.

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Write for prices . . . All sizes—½″ to 5″ carried in stock for immediate shipment.

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Allis-Chalmers boosts work hours, cuts costs with the best tractor undercarriage in the business. You get industry's toughest track... best designed track guards ... certified, permanently lubricated truck wheels, idlers, support rollers.

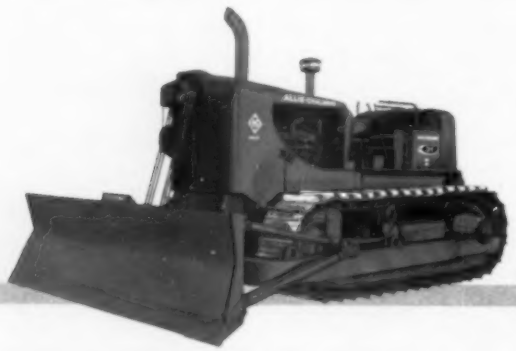
Next time you watch track shoes squeal and grind against jagged rock . . . or see 'em buried sprocket-deep in mud, consider this: Nothing slugs it out with tough conditions like an Allis-Chalmers tractor undercarriage.

Specially heat-treated track shoes, side bars, track pins and bushings are the industry's toughest. Bushings extend into counterbored side bars to seal out dirt, provide more bearing area.

Track guiding truck wheel guards provide a deep-flanged guide channel that keeps track riding true on sprockets, idlers and truck wheels even in the roughest and toughest going. The solid A-frame holds the truck frames in absolute alignment — keeps track running straight.

PERMA-SAFE truck wheels, idlers and support rollers on all Allis-Chalmers tractors roll on tapered roller bearings, are protected against dirt and moisture by Positive Seals. Factory-lubricated, they're certified never to need further greasing.

We invite a maintenance cost comparison with any other tractor undercarriage. We further invite you to inspect the Allis-Chalmers healthy, long-lived tractor engine, the all-steel main frame, double-reduction final drives and many other cost-cutting features. Your Allis-Chalmers dealer will be happy to give you full details. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.



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power for a growing world

21

PEOPLE IN THE NEWS

Klein and Smith retire at Dragon Cement Co.

WILLIAM H. KLEIN (left) has retired as executive vice president of production of Dragon Cement Co., New York, N. Y., a division of the American-Marietta Co. Mr. Klein joined Dragon as operating manager in 1946 when it was the Lawrence Portland Cement Co., and one year later became a director and vice president of the company.

A pioneer in the cement industry, Mr. Klein started his career in Kansas in 1906, after graduating from the University of Michigan with a degree in chemical engineering. In 1911 he joined a cement company in Tennessee, and when it became part of the Penn-Dixie Cement Corp., he was appointed operating manager of the southern division. In 1933 he was appointed general operating manager and vice president of Penn-Dixie Cement Corporation.

Mr. Klein has been active for many years in the development of cement technology. Among his contributions are the air meter for measuring the amount of air in fresh concrete and also the method now largely used in blending raw materials in the dry process manufacture of cement.

Since 1916 Mr. Klein has served on the ASTM Committee on Cement Specifications, and has also served on the board of directors. At one time he was a member of the General Technical Committee of the Portland Cement Association, and for 14 years was chairman of the Technical Problems Committee. He is a former director of the American Concrete Institute.

R. H. B. Smith (right) was elected vice president in charge of sales in 1950. Prior to that he was sales manager for Dragon brand cements for Lawrence Portland Cement Co. before it became Dragon Cement Co. He was elected a director in 1953. Prior to joining Dragon Mr. Smith was associated with Universal Atlas Cement Company.

William Hoffman succeeds W. F. Mackenzie at Whitehall

WILLIAM S. HOFFMAN has been named chief chemist at the Cementon, Pa., plant of The Whitehall Cement Manufacturing Co., Philadelphia, Pa. He succeeds William F. Mackenzie who has retired after nearly 40 years in the cement industry. A graduate of the University of Maryland, Mr. Hoffman has been assistant to Mr. Mackenzie since 1950.

Mr. Mackenzie's career in the cement industry began in 1921 when he became assistant chief chemist at the El Paso, Texas, plant of Southwestern Portland Cement Co. In 1925 he was made chief chemist at the Fairborn, Ohio, plant. In 1928 and 1929 he was the company's representative on ASTM Committee C-1 on Cement; the American Chemical Institute, and the Technical Problems Committee of the Portland Cement Association.

In 1929 Mr. Mackenzie left Southwestern to become assistant to the general manager of Pretoria Portland Cement Co., Ltd., in Johannesburg, South Africa. He returned to the United States in 1937 and for the next six years served Lawrence Portland Cement Co. (now Dragon Cement Co.) on production research and development at the Northampton plant. He joined Whitehall Cement Manufacturing Co. in 1943 as chief chemist.

WILLIAM S. HOFFMAN

In his long career Mr. Mackenzie has made many contributions to the

(Continued on page 49)

IN FLORIDA, LEHIGH PORTLAND ZEROS IN ON ELECTRICAL SYSTEM RELIABILITY, SAFETY, LOW MAINTENANCE

ZEROS IN

When the Lehigh Portland Cement Company built its new plant about five miles west of the Miami city limits, prime considerations for the plant's electrical system were maximum reliability, personnel safety and low maintenance. Careful planning and selection of Westinghouse equipment scored a bull's-eye. For details on how Lehigh Portland achieved these objectives . . . turn the page.

Westinghouse

POWER FOR PRODUCTION at Lehigh Portland's new Miami plant is supplied by this main 15,000-kva double-ended substation located outdoors. It is double-ended for easier maintenance without a power outage, and located on the windward side for less flashover. This design gives greater flexibility and reliability. Some advantages are periodic insulator and bushing cleaning, no load tap changing, reduced capacity operation . . . all without a power outage. Like most electrical equipment in the plant, substation has provision for extra capacity, will accommodate 18,750 kva.

J-96149-1

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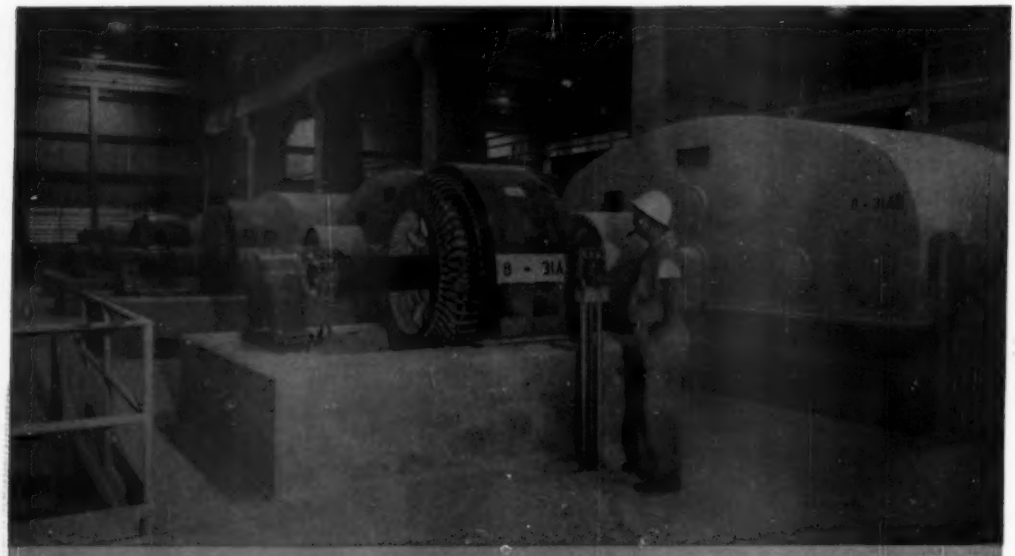
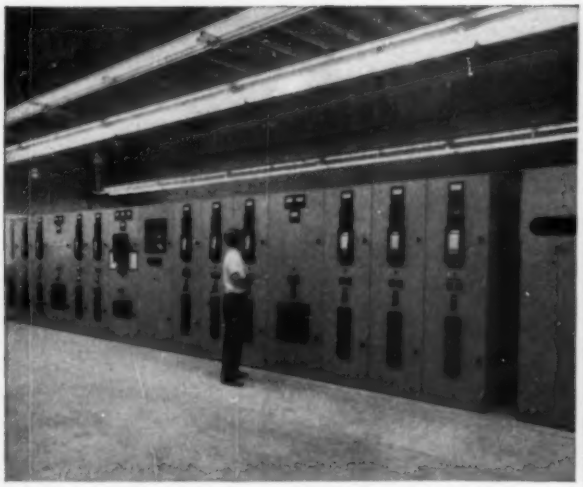
HERE'S HOW LEHIGH PORTLAND HIT

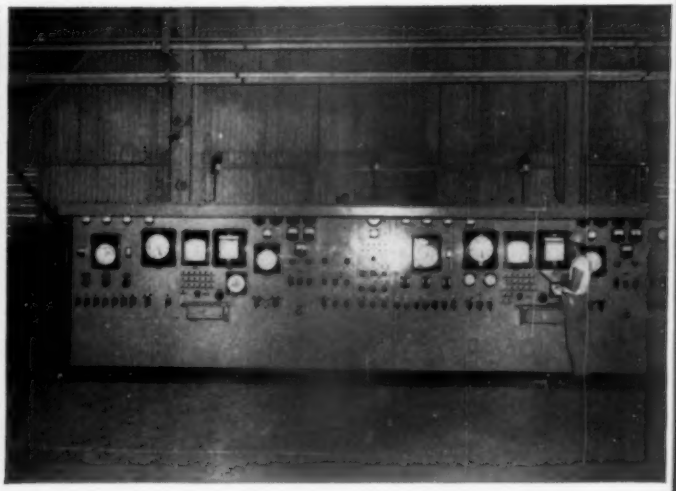


SYNCHRONOUS, COUPLED-TYPE MOTORS driving the Lehigh plant ball mill help assure top production. Thermalastic® insulation, with neoprene coating, offers a dimensionally stable, resilient insulation unaffected by wet and abrasive atmospheres. Saturable reactor control eases the motor into the gear train to bring the mills up to speed.

J-96149-2



SIMPLICITY, RELIABILITY, LOW COST are big benefits of plant's radial distribution system using metal-clad switchgear with protective Type DH drawout air circuit breakers. Switchgear permits independent operation of plant departments, facilitates metering. Indoor switchgear is used in this plant.



CONTINUOUS CHECK on performance is maintained with Westinghouse recording and indicating instruments on many phases of plant's automatic operation. These sensitive instruments keep production records accurate and help plant personnel hold production at maximum output without overloading the equipment.

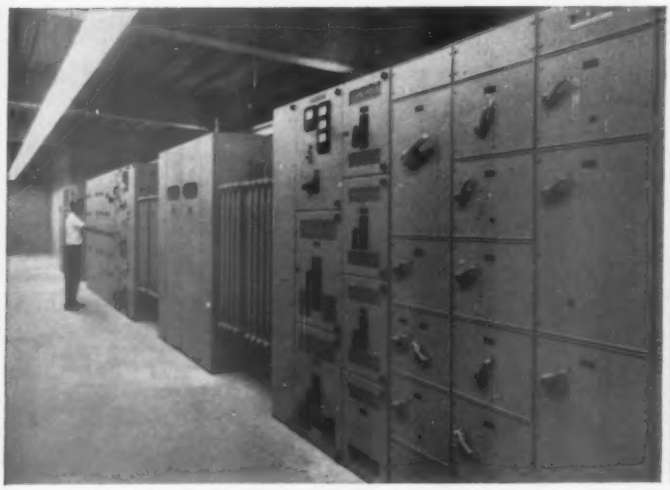
ELECTRICAL GOALS WITH WESTINGHOUSE

At its Miami site, Lehigh Portland Cement Company has built a highly modern plant to effect economies in cement production. Helping to bring about these economies are the reliability, safety and low maintenance of the plant's electrical system. Here are some of the ways in which Westinghouse planning and equipment achieved these system goals:

- All equipment was selected to provide adequate, uninterrupted service for today, yet provide for easy, economical expansion to meet future demands.
- Westinghouse indicating and recording instruments are used in the plant for on-the-spot checks of processes.
- The Everglades site is located in a humid area and was under water most of the year. Even when the plant grade was raised, water seepage could cause damage to the underground electrical system. The design of Westinghouse equipment, special watertight manholes and rigid steel duct encased in concrete overcame this difficult problem.
- A simple, radial system distributes power from the main substation to the plant's operating departments. Small, low-cost power centers located at load concentrations achieve lower voltage drop, less power loss, more flexibility and greater reliability.
- Maximum protection for personnel and equipment at the quarry is provided by special system grounding precautions.
- The outdoor substation proved more economical than one indoors or under a roof.
- Distribution voltage for the plant is 4160 volts, making possible savings in initial cost.
- Voltage drop during starting of the 1250-hp ball mill motors—the most severe system requirement—is estimated to be only 5.6%, which minimizes the malfunctioning of this and other electrical equipment.

Westinghouse

J-96149-3



OPERATING RELIABILITY is possible with small, economical indoor Inerteen® Power Centers installed in clean, pressurized rooms. Location at load concentrations minimizes voltage drop and losses.

MAXIMUM PROTECTION is afforded personnel and equipment in the rock quarry by use of safety-resistance grounded systems. Portable switch houses immediately isolate faulted cable and equipment.

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HOW LEHIGH PORTLAND HIT ITS GOALS (*continued*)

The down-the-line planning and careful coordination of equipment that went into the Lehigh Miami plant are basic to the Westinghouse approach to electrical equipment for top cement production. For more information, call your nearby Westinghouse representative today . . . or write Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Pa. You can be sure . . . if it's Westinghouse. J-96149-4

Westinghouse

RELIABLE, FINE CONTROL is provided by Westinghouse equipment for this overhead traveling crane using an adjustable voltage, direct-current bucket drive. Westinghouse control helps keep raw materials flowing through the plant smoothly.

AUXILIARY POWER generated by a 438-kva, 0.8 p-f diesel generator. This unit can tie in to supply critical loads, such as air compressors and lighting, subsequent to a power failure.

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continued from page 44

cement industry. He developed Rich Mortar, a masonry cement, and shared in the development of Miami Hydroplastic, a special plastic waterproof cement. He also developed Rapacrete, a high-early-strength cement, and he invented Plasterlite, a white masonry cement for use in tropical climates.

Great Western Aggregates names new sales manager

ALBION H. WETHERELL has been appointed to the newly-created position of sales manager of Great Western Aggregates, Inc., Little Rock, Ark., wholly-owned subsidiary of Ideal Cement Co. In his new position Mr. Wetherell will have charge of the entire sales territory which includes Colorado, western Kansas, Nebraska, New Mexico, Utah and Wyoming.

A native of Attleboro, Mass., Mr. Wetherell attended Colorado A & M at Ft. Collins where he studied civil engineering. He has been associated with Ideal and Great Western Aggregates since 1923, and has been assistant sales manager of GWA since the year 1957.

James McLeroy named Solite division manager

JAMES H. MCLEROY, JR., has been appointed manager of the Solite Silica Div. of the Solite Corp., Richmond, Va., according to an announcement by A. Cabell Ford, sales director. Mr. McLeroy, who attended the University of Virginia Extension, joined the Solite Corp. in 1959.

Texas Industries names vice president

LESLIE D. FAIN has been elected a vice president of Texas Industries, Inc., Dallas, Texas. Since 1951 Mr. Fain has been general manager of the Louisiana Lightweight Aggregate Co. and the Central Culvert Corp., Alexandria, La., both subsidiaries of Texas Industries.

Colon Brown elected Huron Cement director

COLON BROWN, vice president in charge of corporate development of National Gypsum Co., Buffalo, N. Y., has been elected a director of Huron Portland Cement Co., Detroit, Mich.

OBITUARIES

J. Harper Fulkerson, president of Cross Engineering Co. until his retirement in 1958, died October 17 after a brief illness. He was widely known in the rock products industry and served for many years as chairman of the Manufacturers Division of the National Crushed Stone Association.

An extensive traveler with many friends in the business world, Mr. Fulkerson was born in Prompton, Pa., and lived most of his life in Carbondale. He was a graduate of the Eastman Business School in Poughkeepsie, N. Y., and began his business career as assistant to the secretary-treasurer of the Carbondale Machine Co.

Mr. Fulkerson joined Cross Engineering Co. in 1924, where he directed sales and product development policies. He was named vice president in 1933 and elected president in 1947.

At the time of his death Mr. Fulkerson was president of the Jay Harper Co., Carbondale marketing specialists.

David W. Newman, vice president of the Wall Washed Sand & Gravel Co., Belmar, N.J., died October 16 at the age of 69.

Frank A. Sweeney, vice president in charge of sales, National Portland Cement Co., Philadelphia, Pa., passed away September 26. He was 67 years old and had been associated with the company since 1942. Mr. Sweeney started his career in the cement industry in 1909 when he joined the Atlas Portland Cement Co. In 1916 he became associated with the Edison Portland Cement Co. where he remained until 1942 when he joined National Portland Cement Co. He was elected vice president in 1948 and became a member of the board of directors in the year 1956.

Harold B. Robeson, president and a director of Nazareth Cement Co., Nazareth, Pa., died October 6 after an illness of several months. He was 64 years of age. A recognized leader in the cement industry, Mr. Robeson served for many years as a director of the Portland Cement Association and on various association committees. His career in the cement industry began 47 years ago. He started as a clerk with Universal Atlas Cement Co. in 1913, became a salesman in 1919 and district sales manager in 1920. He joined Nazareth Cement Co. as general sales manager in 1924 and served in that division until 1933. He was vice president from 1933 to 1937, and executive vice president until 1940, when he was elected president.

Walter A. Rukeyser, mining engineer and geologist, died October 16. A specialist in the mining of asbestos, Mr. Rukeyser had been active in recent years as a consultant. He graduated from Princeton University and received his mining engineering degree from Columbia University. In 1930 Mr. Rukeyser worked in Russia as a consulting and supervising engineer in connection with asbestos production. He also did much work in Canada.

END

FOR RESULTS LIKE THIS ON YOUR NEXT SHOT...

WHICH

There's a lot of easy digging in this low-lying, well shot pile. A minimum of secondary blasting is needed, and there's no towering muck pile to come showering down on your men or equipment. Breakage and displacement like this gets every possible hour of service out of all your equipment.

Effective blasting control doesn't just happen. There is a combination of explosives and blasting methods that is right for every shot. For instance, if the conditions in your quarry lend themselves to the use of AN blasting agents, *new* Atlas Pellets are porous, compact particles that have higher density and sensitivity for more efficient blasting. On the other hand, for some rock formations, high explosives often do a better job—and more economically. In addition, all types of blasting caps, primers, and special packaging methods are available from Atlas . . . each designed for certain conditions and types of work.

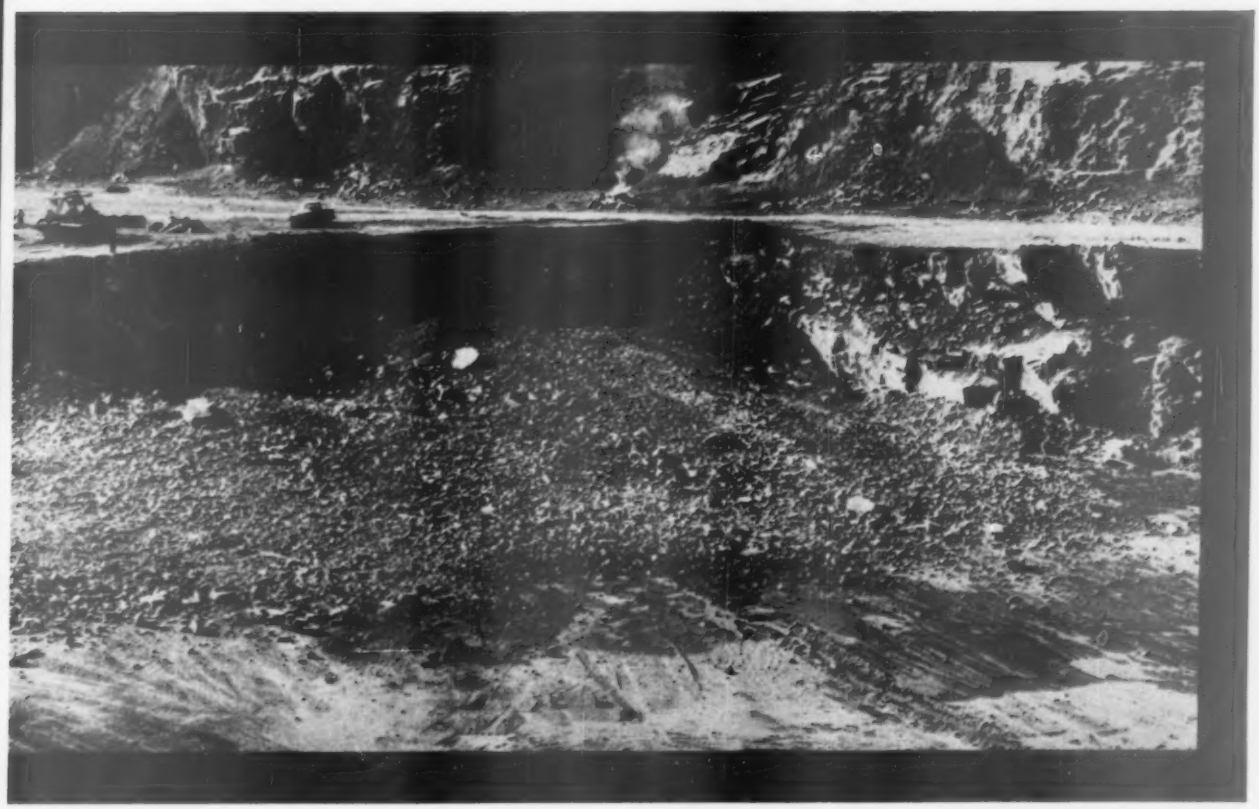
Which Explosive? That's the job of your Atlas Representative. Backed by the complete Atlas line (including all types of ammonium nitrate), his experience with the latest advances in explosives and techniques can help you find the explosives combination and the particular blasting methods that will be most profitable for you on every shot. Our blasting cost chart, slide rules and technical literature are designed to help you determine your lowest true blasting costs. Ask your Atlas Representative about them—or write directly to:

ATLAS POWDER COMPANY
Explosives Division, Wilmington 99, Del.

When you use the right combination,
all your equipment
moves in sooner...
works faster...
produces more.

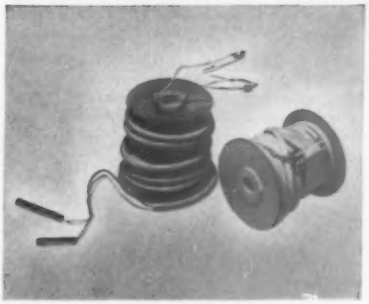
ATLAS PELLETS, a new form of ammonium nitrate, are porous, compact particles that have both the density and sensitivity required for efficient ammonium nitrate blasting.

EXPLOSIVE?



GIANITE, a pre-mixed form of ammonium nitrate, provides the flexibility needed to use ammonium nitrate blasting agents where on-site mixing is difficult or impractical.

GIANT "75" PRIMERS have the wallop required for complete, efficient detonation of both field mixed and plant mixed AN blasting agents, even under severe conditions.



TWINPLEX BLASTING CAPS are two E. B. caps with the leg wires enclosed in a plastic sheath—for detonation at the bottom of deep blast holes, the point of maximum confinement.

ATLAS **ATLAS EXPLOSIVES**

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INDUSTRY NEWS

KAISER CENTER in downtown Oakland, Calif., rises 28 stories; curves gently along 420 ft. of shoreline on Lake Merritt. A 1,200-car garage is topped by three acres of roof garden. Extension at front houses a cafeteria and auditorium.

Kaiser products come home

THE TALLEST SKYSCRAPER west of Chicago has risen on the rubble of a 79-yr.-old college in Oakland, Calif. Behind the curving facade of glass are headquarters for all 60 affiliate companies of Kaiser Industries Corp. Kaiser center is unique among office buildings. It is not only owned by four major Kaiser industries, but it also stands as a monumental showcase for 300 basic products emanating from the organization's firms. Approximately 80 percent of the structure itself is representative of such materials and skills.

The building is 390-ft. high and contains a complete shopping center and department store, as well as a five-level, roofed garage with 12½ acres of floor space. Of the 28-floor Center's total of 1.7 million sq. ft., 980,000 sq. ft. are alloted to office space. Here, on a seven-acre lakefront site, 2,500 employes are "at home" under one

(Continued on page 56)

LOBBY OF KAISER CENTER is a showcase of materials produced by 60 Kaiser companies, Terrazzo floor displays multicolored aggregates, precast concrete column panels contain white dolomite, ceilings are Kaiser Gypsum tile.

Enter 1224 on Reader Card

AGAIN!

IT'S EAGLE SAND WASHING EQUIPMENT FOR SUPERIOR STONE CO.

DIVISION OF AMERICAN-MARIETTA CO.

The Eagle Sand Washing—Classifying—Dehydrating Section at the Woodleaf, N. C. plant of Superior Stone, shown above, is their latest addition of Eagle Equipment. They are producing an asphalt sand from screenings in their quarry which has about 7 to 7½% minus 200 mesh. No mineral additives are necessary.

The Eagle section consisting of a 32′ Water Scalping—Classifying Tank and a 44′ x 32′ Single Screw Fine Material Unit, does an excellent job of economically washing, classifying and dehydrating this material, at the same time retaining the highly desirable fines.

Their first Eagle section, below at left, installed in 1957, is shown at the Superior Stone, New Bern, N. C. plant. Their second installation made early in 1959 at the McLeansville, N. C. plant is shown below at right. These plants also produce manufactured sand, the Eagle equipment aiding in retaining the needed fines.

When you install Eagle Equipment you get more than just machinery—you get the benefit of Eagle's experience which goes way back to the very beginning of sand washing—you get service that is available to you for the entire life of your Eagle equipment—you get sound recommendations based on integrity. (SEND FOR COMPLETE FACTS IN CATALOG 58.)

Factory-Trained Distributors Everywhere

EAGLE IRON WORKS

ENGINEERS * MANUFACTURERS

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EAGLE IRON WORKS

HOW TO SAVE $50-75 DAILY, SPEED CUSTOMER SERVICE

B. W. Beeman, Anderson, Ind., lowered handling costs and increased production of clay-gravel base mix by replacing a hopper-fed portable conveyor with a 48′ Barber-Greene PS-70 Portable Screening Plant with trap feeder.

The gravel company owner reports: "Our new plant helps us save $50-75 on the 500-1,000 tons produced daily. Now we doze material directly from bank to trap and save 10-15¢ per ton handling costs. We've speeded customer service, too, by being able to load out 10-ton trucks in 60 seconds. And the consistent accuracy of clay-gravel mix obtained by our dozer blending through the trap feeder gives us a competitive advantage that has brought in considerable new business."

Here's why your Barber-Greene Distributor can match this new plant to your needs: capacities—155, 270, 430 and 630 tph . . . belt widths—18, 24, 30 and 36″ . . . conveyor lengths—42 and 48′ . . . single deck screen sizes—36, 42 and 48″. Get this rugged plant with exclusive Vibra-Spring screen suspension and save money and time producing sized aggregates.

Heavy-duty portables cut stockpiling costs

J. P. Hollerich & Co., LaSalle, Ill., paving contractors, save time and money unloading and stockpiling aggregates for asphalt operations by teaming two portable Barber-Greene units, a 358 Hopper Car Unloader and a 24″ x 66′ PA-70 Conveyor.

Plant Supt. F. J. Funfsinn and Gen. Supt. John F. Livec relate: "Our Barber-Greenes give us the dependable high-capacity performance we need to keep our plant operating at top capacity. The unloader-portable conveyor team has unloaded 65,000 tons of ¾″ stone and sand at 120 tph, and we empty and stockpile 56 tons of rock from a car in just 30 minutes."

Highly-portable Barber-Greene 358 Car Unloader and truss-type PA-70 Portable Conveyor are shown unloading sand for Hollerich's Barber-Greene 894 Batch-Omatic plant located at Atkinson, Ill.

The Beeman-owned PS-70 plant has a 36" belt and a double loop Vibra-Spring screen suspension that puts 35% wet clay over the screen without blinding. This exclusive feature also doubles the shock resistance and life of vibrating mechanism parts.

Model 358—Car Unloader | Model 362—Portable Conveyor | Model 363—Portable Conveyor | PA-80—Portable Conveyor

Barber-Greene portables for every requirement

Barber-Greene's portable materials handling equipment line includes seven truss and channel frame Portable Conveyors plus the 358 Car Unloader. Biggest of the truss models is the PA-80, available in 69, 75 and 81′ lengths, available with torque-arm or line shaft drive. Other heavy-duty truss models, all in lengths from 33-60′, include PA-70 (torque arm drive), PB-70 (V-belt drive) and PC-70 (line shaft drive). Model 363 tops the channel frame line and is offered in 25, 30, 35, and 40′ lengths. Model 362 is available in 20, 25 and 30′ lengths. All are precision built and completely portable.

SEND FOR NEW BULLETIN

New Portable Conveyor Bulletin tells how these rugged units can cut your handling costs, shows how to select the correct models for every requirement, and includes full information about each conveyor in the complete Barber-Greene line. Ask for your copy today.

The ultimate in precision-built portable conveyors

Representatives in Principal Cities of the World

Barber-Greene BG

Main Office and Plant AURORA, ILLINOIS, U. S. A.

Plants in DeKalb, Illinois..Detroit..Canada..England..Brazil..Australia

CONVEYORS • LOADERS • DITCHERS • ASPHALT PAVING EQUIPMENT

continued from page 52

roof for the first time since Henry J. Kaiser started the business 46 years ago.

Among Kaiser materials utilized in the new center is Permanente cement for some 60,000 cu. yd. of concrete—enough to lay a standard sidewalk from Oakland to Reno, Nevada. This runs the construction gamut from the floating supporting slab beneath the office building to the 28 floors, the supporting piles of the shopping area and all five levels of the garage. Additional quantities were used in more than 1,000 decorative stone panels for the office-building end walls and the shopping area, and for 4,500 cu. yd. of fireproofing gunite applied to the office-building girders.

Kaiser Gypsum supplied acoustical tiles, rock wool and 250,000 sq. yd. of lath-and-plaster wallboard. Plastering was a $1.5-million contract in itself.

Henry J. Kaiser Co.'s Sand & Gravel Div. furnished more than 96,500 tons of aggregates for the concrete and terrazzo of the first and second-floor lobbies. Nearly 1,500 tons of dolomite from Kaiser Aluminum's Refractories & Chemical Div. are imbedded in concrete panels and lobby columns.

Henry J. Kaiser, Sr., chairman of the corporation, calls attention to the building's flexible design. It can be expanded "for an anticipated staff growth to 4,000 in the near future." The Kaiser Center is already the hub of operations for 97 plants and other facilities in the United States and abroad, with annual sales of nearly $1 billion and assets of $1.7 billion.

Ruberoid observes 74th anniversary

CEREMONIES MARKING THE 74th anniversary of The Ruberoid Co., New York City, were held in October in all 20 of the company's plants throughout the United States. Now a major producer of building and industrial products, it started as a small business in the year 1886.

Singled out for special recognition were members of the company's "Twenty-Fivers"—an honorary organization of employes with 25 or more years of service. A group of 87 new members was welcomed into the club this year, bringing the total membership of active employes to 505. There are also 184 retired members.

Speaking from Ruberoid's executive offices in New York, President E. J. O'Leary told 5,200 employes that "the uncertainty that has characterized the national economy in 1960 has provided another test of Ruberoid's ability to fulfill its obligations to many." He praised the spirit of cooperation shown by the company's employes.

In closing his address, he spoke of Ruberoid's part in building a brighter future for everyone in America. "Our progress as a very young nation," he said, "can be but the shadow of a greater, more prosperous America if the vast resources in mind and matter available here at home are nurtured and used wisely and fully. Greater awareness of this need on the part of national leaders has become apparent, lending encouragement to the hope that more dynamic and fruitful programs to muster all of our capabilities will be forthcoming."

Building costs rise in six-month period

CONSTRUCTION COSTS in the United States (excluding Alaska and Hawaii) rose another one percent between April and October of this year. Coupled with the same percentage of increase in the six months prior to April, this brings the total cost-rise in a 12-month interval to 2 percent.

The Dow Building Cost Calculator based these estimates on an averaging of building materials prices and hourly wage data sampled in 144 metropolitan areas throughout the country. Other elements of cost taken into consideration include design, taxes, insurance, money and some competitive conditions.

Myron L. Matthews, managing editor of the publication, explained "Generally, it takes $2.61 to buy and assemble the materials today that took only $1 in 1941. This brings the 1941 building dollar down to 38¢ at the present market.

"The $7,500 'dream house' of 19 years ago would cost $19,575 to put up today. An industrial plant costing $250,000 in 1941 would require $652,000 to duplicate now. Office buildings in the current $25 per-sq.-ft. class were available for less than $10 in 1941."

A breakdown shows that prices for materials increased between one and 3 percent in 35 of the metropolitan areas, and went down between one and 5 percent in 14 areas and remained unchanged in 95 areas during the April-to-October interval.

Labor costs in the same period went up between one and 7 percent in 117 of the cost-sampling areas, dropped one percent in one and remained unchanged in 26 areas.

Combining the material prices and labor costs, the Dow Calculator reports increases of between one and 4 percent in 102 of the cost-sampling areas, decreases of between one and 2 percent in 6 areas and no changes in the 36 remaining locales.

Looking to the future, the study forecasts an annual increase of from 3 to 4 percent in construction costs in the year 1961.

Production facts on portland cement

PRODUCTION OF finished portland cement in September 1960 totaled 31.1 million bbl., reported the U. S. Bureau of Mines. This was down 4 percent from 1959. Mill shipments were 33.6 million, also representing a 4-percent decrease from the level of the same period last year. Stocks of 30.5 million bbl. of finished portland on hand were 21 percent more than in September 1959. Clinker production was 28 million bbl., a decrease of 7 percent from the same month last year.

Figures for September were compiled from 169 plants in 38 states and Puerto Rico.

Riverside Cement ups 1961 prices

PORTLAND CEMENT PRICES will go up 25¢ a bbl. in bulk and 35¢ a bbl. in sacks, according to an announcement by Riverside Cement Co. The company, a West Coast division of American Cement Corp., said the rises will take effect on January 1.

(Continued on page 58)

What's coming in January

What's Ahead For 1961 . . . This is the usually looked-for forecast for business in 1961. It is the consensus report of individual industry producers who favor us with their estimate of production and other possibilities for the coming year. Read it, and check your own forecast with that of the industry as a whole

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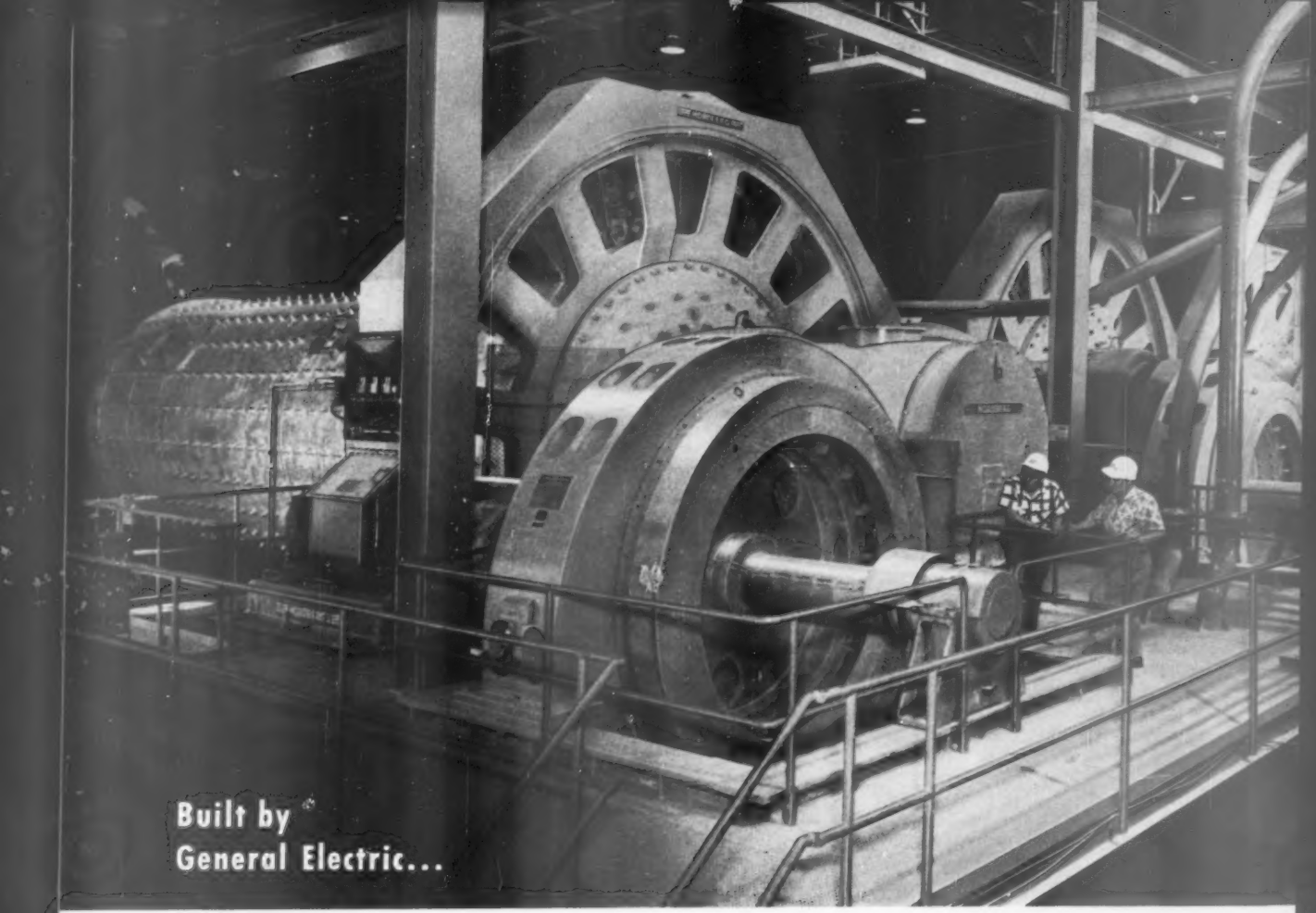

WORLD'S LARGEST Ball-mill Motors Power Huge Cement Grinding Mills

Dundee Cement Company chose General Electric to supply the motors for the largest five ball-mills in the world at its new plant in southeastern Michigan, one of the most modern plants of its kind in the world.

Each of these massive mills contains 400,000 pounds of steel balls plus the tons of material to be pulverized. To drive these immense loads, General Electric designed and built into five 2500 horsepower synchronous motors the "know-how" gathered from years of experience with ball-mill motors.

Each motor provides the torque to start the enormous load from standstill, yet causes minimum voltage disturbance of the power system. It can withstand the adverse conditions of dust and heat and run for long periods without shutdown. These G-E synchronous motors were literally tailor-made to meet all the requirements of ball-mill service.

Engineering and manufacturing experience obtained by General Electric in building hundreds of motors for ball-mill drives, and the proved, dependable performance of G-E synchronous motors on all types of heavy-duty applications, assure you of motors that will withstand unusual demands and require only a minimum of maintenance.

The next time you need drive motors for heavy, continuous-service equipment, be sure to call in your General Electric Apparatus Sales Engineer.

In the meantime, you can obtain more information on G-E synchronous motors by writing for GEA-5959, Section 775-13, General Electric Co., Schenectady 5, N. Y.

LARGE MOTOR & GENERATOR DEPARTMENT

GENERAL ELECTRIC

continued from page 56

NSGA makes sixth annual safety awards

RESULTS OF THE 1960 Safety Contest were analyzed recently for its membership by the National Sand and Gravel Association. The period covered was from July 1, 1959, to June 30, 1960.

The Irwindale Plant of Consolidated Rock Products Co., Los Angeles, Calif., won the Class A competition (plants producing more than 500,000 tons of sand and gravel during the period) for the third consecutive year. It operated without a single injury during the contest interval. Twenty-three other plants also achieved accident-free records. But Irwindale was judged the winner on the basis of the Association's policy for breaking tie scores. This gives the award to the plant having a combination of the greatest number of man hours worked and the largest tonnage of sand and gravel produced during the contest. The also-rans were presented with Certificates of Achievement in Safety.

Fifty-three plants entered in the Class B competition (plants producing between 200,000 and 500,000 tons of sand and gravel) had accident-free records. The Kinder Plant of Gifford-Hill & Co., Inc., Dallas, Tex., was awarded the trophy on the same basis of man hours worked and tonnage produced. Certificates of Achievement in Safety were awarded to the remainder of the contestants.

The Class C competition (plants producing less than 200,000 tons of sand and gravel during the contest) was won by the Land Plant of St. Catherine Gravel Co., Natchez, Miss. Certificates of Achievement in Safety were awarded to 65 other plants.

Michigan ahead in highway construction

AT THE END OF EIGHT MONTHS, the state of Michigan was out front in the nation's competition for highway construction. The U. S. Bureau of Public Roads reported that the state had placed 100 miles of Interstate highway under contract at a cost of $55.8 million between January 1 and August 31, 1960.

Texas came in second in the same period with 93 miles, followed by Missouri with 76, California with 75, and Illinois and Wisconsin each with 74 miles.

The grand total of awards made during this time by the Michigan State Highway Dept. was $140.2 million for construction and modernization of 1,144 miles of all types of highways —freeways included. Illinois ranked second with $126.1 million, followed by Ohio with $112.8 million, Indiana with $58.9 million, and Wisconsin with $46.8 million.

Highway Commissioner John C. Mackie said that the thickness of shoulders on Michigan's freeways is to be doubled. Shoulders formerly were about ¾-in. thick. They were finished with a double coating of liquid asphalt mixed with stone chips. Under new specifications, shoulders will be paved with asphalt and have a thickness of one and three-quarters in.

"The cost of the paved shoulders will be higher," Mackie said, "but they'll save money eventually because maintenance costs will be lower."

Alpha Portland cuts dividend

ALPHA PORTLAND CEMENT CO., Easton, Pa., cut its quarterly dividend on common stock to 15¢ from 45¢ and declared a 2-percent stock dividend payable to holders of record on November 15.

Net income for the third quarter of 1960 was $2.7 million, a decline of 14 percent from the comparable figure last year. Earnings for the first nine months were $4.4 million, 21 percent less than for the same period in 1959.

Shipments for the nine months were 9 percent below the same period last year. This was due, in part, to unfavorable weather conditions during September and in the first quarter. An increase in operating costs further contributed to the reduction.

Expanded lines spark Radcliff name change

AERIAL VIEW of McDuffie Island shows manufacturing facilities of Radcliff plant

RADCLIFF MATERIALS, INC., Mobile, Ala., is the new name for an old company that has been a subsidiary of Southern Industries, Inc., since 1946. The company, long known as Radcliff Gravel Co., Inc., was founded in 1908. Its headquarters are still in their original location on McDuffie Island, Mobile, Ala.; but branch offices were opened one-by-one in Pensacola and Ft. Walton Beach, Fla., and in Long Beach, Miss. Latest addition is a sales office and concrete block storage yard in New Orleans, La.

For many years, the founders dealt only in sand and gravel aggregates. Then, in 1938, they began producing ready-mix concrete. This phase of the operation expanded so steadily that it is now one of the major items in terms of the company's yearly gross revenue. Experiments with crushed oyster shells resulted in an aggregate that led to a wide range of materials for road-building and construction industries. New hot and cold asphalt plants were followed by a third in 1950 that produces an average of 16,000 lightweight block a day.

What with production reaching new plateaus of both quantity and variety, it was evident that the Radcliff Gravel Co. had finally outgrown its name.

(Continued on page 60)

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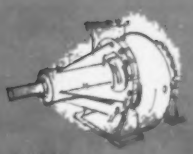
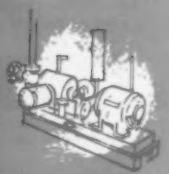

PUMPS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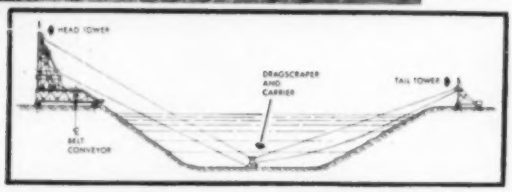
For more information contact your A-C representative or write Allis-Chalmers Industrial Equipment Division, Milwaukee 1, Wisconsin. A-1358

Tough Digging, Long Hauls... Routine Jobs for Sauerman DragScrapers

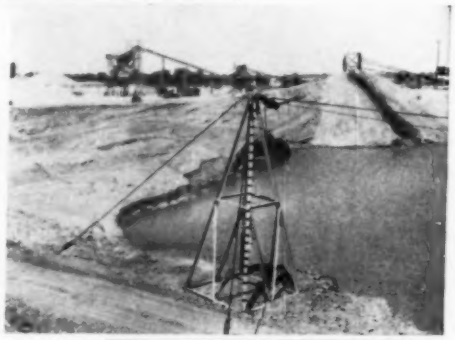
240-Ft. Bank... 350-Ft. Haul

This mobile Sauerman Tower Excavator digs 480 yds. per hr. on an average haul of 350 ft. from a high bank to a portable field hopper. The 12-yd. Crescent DragScraper operates between steel head and tail towers. The towers are mounted on two sets of railroad tracks and ride on four sets of trucks. DragScraper power is supplied by two hoists mounted on the head tower. One hoist operates the load and pullback cables, the other is used to tension the track cable. The hoists are controlled by one operator located in the cab on the tower. The load cable handles over 400,000 tons of material before replacement.



Drawing shows typical mobile tower excavator digging in wet pit.

75 Ft. Under Water... 800-Ft. Span



A 5-yd. rapid-shifting DragScraper supplies about 200 yds. per hr. to the plant hopper in background. Bridle tower in foreground is one of two supporting the bridle shifting cable which is controlled by the third drum of the Sauerman hoist. Lateral shifting of the DragScraper's line of operation is readily accomplished by power-shifting the trolley and tail block to a new position on the bridle cable. The DragScraper is digging 75 ft. under water and the operating span is 800 ft. from head frame to the bridle towers. Over a million tons have been excavated from this pit. The DragScraper often operates 24 hrs. a day to handle contract demands.

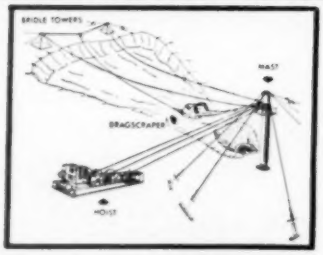


Diagram shows details of Sauerman rapid-shifting DragScraper.

Sauerman machines dig and haul in one continuous operation... work on high bank, dry pit or under water... handle most bulk materials. Consult Sauerman engineers about your job. We will promptly supply appropriate literature.

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Crescent Scrapers • Slackline and Tautline Cableways • Dyrolite Blocks

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(Continued from page 58)

Marquette acquires North American

EXECUTION OF AN AGREEMENT to acquire the business and assets of North American Cement Corp., New York, was announced by Marquette Cement Mfg. Co., early in November. The Chicago company will assume the liabilities of North American and will issue 575,158 common shares of Marquette for distribution to North American's shareholders. The ratio will be one Marquette common share for each one and one-fourth common shares (Class A and Class B) of North American.

The transaction is expected to constitute a tax-free reorganization under the Internal Revenue Code. Subject to the approval of shareowners of the respective corporations, as well as to certain other conditions, the action should be completed on or before Jan. 20, 1961. Meetings of the shareholders of both companies have been called for January 10.

Acquisition of North American adds cement plants at Catskill, N.Y., Howes Cave, N.Y., and Security, Maryland, to the nine already owned by Marquette. A shipping plant at Framingham, Mass., brings the number of Marquette shipping centers to five.

The business of North American will continue under its present company management.

Miron Co. invites public participation

PUBLIC PARTICIPATION in Miron Co., Montreal, Canada, will be invited just as soon as the company feels that "an appropriate investment climate" exists. The enterprise is a Belgian-controlled construction products group, privately financed by both Canadian and Belgian capital. Its acquisition of holdings of the former Miron & Freres Ltd. was made last July for "about $50 million."

Principal shareholder in Miron Co. is Cimenteries et Briqueteries Réunies. Part of La Société Generale de Belgique, it is one of the largest producers of cement and other building products in Belgium and the Netherlands. It controls cement capaicty of about 25-million bbl.

If Miron Co. follows the investment pattern of another Société Generale affiliate which has been active in Canada for 10 years, Sogemines Ltd., it

(Continued on page 64)

ALLIS-CHALMERS

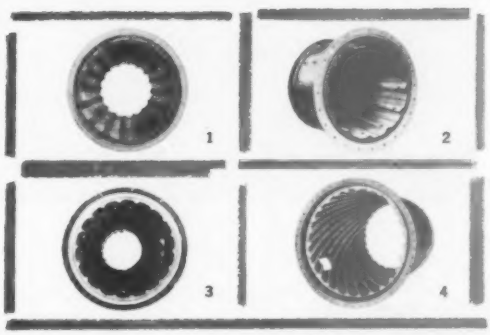
It takes at least four points-of-view

to create the shell liner that does the best grinding job for you

When A-C engineers recommend a shell liner for your grinding mill operation, you can be sure of one thing: it represents years of experience in all phases of mill operation. The first step in determining the right type is a four-point metallurgical and wear pattern analysis. Here are the four points:

First, the ore is analyzed for hardness and abrasiveness. Second, the fineness of grind is examined — a coarse grind requires lifting the grinding media high for impact; a finer grind calls for more abrading action. Then, the mill itself is studied to determine the size of balls or rods needed to accomplish the required grind. Finally, the metallurgical properties of the liner material are investigated to assure longer life.

The right liner lasts longer — and often increases the capacity of your mill. *Ask your A-C representative to look into your shell liner problems, or write* **Allis-Chalmers,** *Industrial Equipment Division, Milwaukee 1, Wisconsin.* A-1366



These four types of liners demonstrate how liners can vary over a wide range of design characteristics to meet the specific requirements of a job. Pictured: (1) Lorain liner, (2) wave type, (3) wedge type and (4) spiral liner.

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SEE YOUR GARDNER-DENVER ROCK DRILL SPECIALIST
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Only Gardner-Denver matches 30 drill-carrier-feed combinations against any hardrock job

You can plan the blast-hole size and depth, the burden and spacing you need for fastest progress. Your Gardner-Denver rock drill specialist will help tailor your rig to meet these conditions. He chooses from the widest selection of crawlers, drills, feeds and accessories in the field.

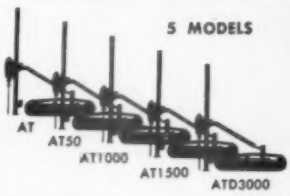
CRAWLER DRILL

MODEL HT143

Heavy-duty drill unit for open-pit mining, quarrying and general construction. Uses a broad range of bit sizes with long steel changes.

"AIR TRAC"®

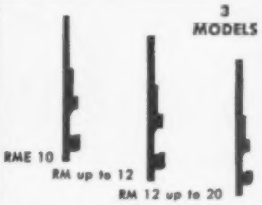
5 MODELS



From the basic, low-investment Model AT to the revolutionary swing-boom Model ATD3000 with fully automatic hydraulic power positioning.

CHAIN FEEDS

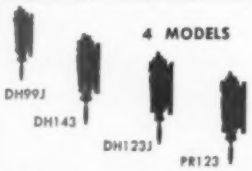
3 MODELS



Powered by dependable 5-piston radial air motors with integral gear reducer drives to heavy-duty, rugged feed chains.

ROCK DRILLS

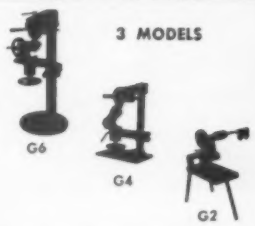
4 MODELS



With 3-position steel rotation, for forward, neutral or reverse direction. News-making PR123 also provides rotation without impact, impact without rotation, or impact with rotation—drills up to 30% faster because it uses all hammer energy directly for percussion.

BIT GRINDERS

3 MODELS



Sharp bits make hole faster and increase drill steel life. Sharpen bits in the field to save time, have the bit when you need it. A model for any size bit.

DRILL STEEL

HI-LEED* DRILL STEEL
2' to 20' LENGTHS
1⅛" AND
1½" HEXAGON

Always uncouples with ease. Snug fit of mating parts increases wear life. Firm connections prevent lost rods.

*T.M.

Complete information in one book. With this booklet and the help of your Gardner-Denver rock drill specialist, you can select the right rig combination to help your next contract reap bigger profits. For your *free* copy, write for Bulletin CDAT-1.

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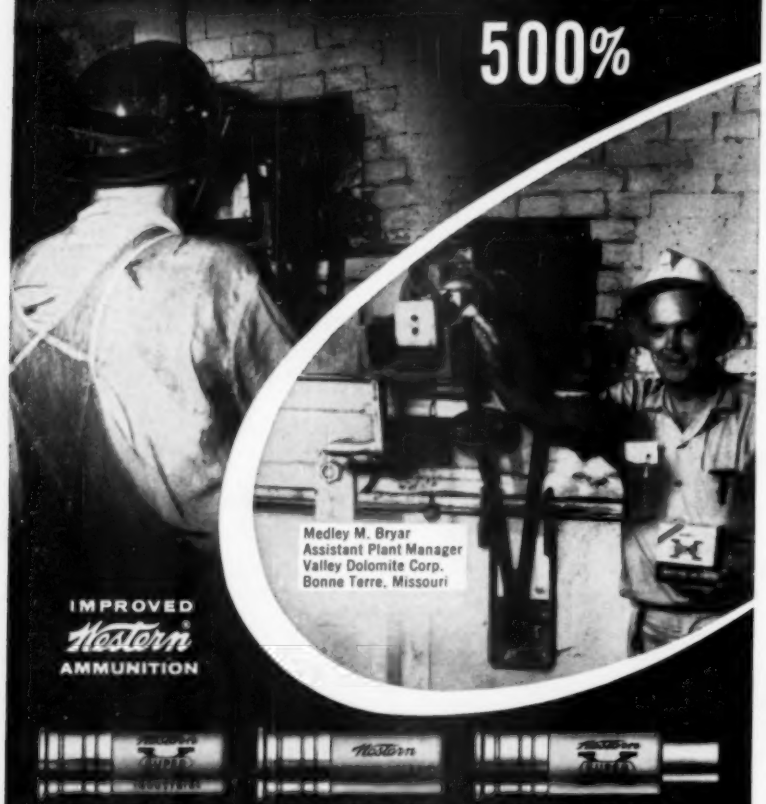
RINGBLASTER with new Western® AMMUNITION INCREASED RING-SMASHING EFFICIENCY 500%



Super-X shell— 8900 ft./lbs. muzzle energy

Reduced velocity shell— 7500 ft./lbs. muzzle energy

Super-X Zinc shell— for maximum penetration

"New improved Western ammunition lets us fire 35,000—45,000 rounds without a stop for gun maintenance," says Medley Bryar. "This is a 500% improvement! The new shells reduce lead accumulation to a negligible point, deliver real smashing power, and are a major factor in our cost-reduction program. We're constantly on the lookout for ways to improve products and operations at Valley Dolomite—Ringblaster kiln gun and improved Western ammunition have filled the bill on fast kiln-ring smashing with a minimum of down-time!"

If you're operating a kiln, you can improve its efficiency with the industry-accepted team... Western Industrial Ammunition and Ringblaster, the safer, quieter kiln gun that's easiest to use. Write for complete money-saving details today!

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(Continued from page 60)

will issue preferred stock to public participants. Subsidiaries of Sogemine listing such shares include Inland Cement Co. and Iroquois Glass Ltd. Canadian Petrofina Ltd., in which Sogemines holds a substantial but minority interest, also offers preferred shares to participants.

Miron property in Canada includes a new cement plant with a capacity of 4-million bbl.; and ready mix plants—one of which is electrically operated—that produce 100,000 cu. yd. monthly. Customers are served by a fleet of 100 cement mixers.

Another factory turns out a million cement block a month. Other units produce asphalt, pipe and other concrete products, as well as undertake construction work. Important limestone quarries are within Miron's industrial center at Ville St. Michele. Sand deposits are held at Oka.

Miron Co. subsidiaries include Canada Concrete Products, Canadian Quarries, Miron Quarry Ltd., Miron Construction Ltd., Garva Inc., Oka Sand & Gravel and Canadian Perlite Corporation.

A new board of directors met for the first time the day before the formal plant opening on November 5. It numbers several prominant Canadians, among them former Prime Minister Louis St. Laurent, who has been appointed chairman.

End of Kansas dispute clears lime plant start

LONG-DELAYED OPERATIONS got under way in September in the new lime plant of Mid-Continent Quarries Co. at Bonner Springs, Kansas. Its start had been delayed for months by a controversy over bids to supply lime to the Kansas City water department. After being awarded the contract, the company had other setbacks, including adverse weather and a long construction strike.

While awaiting production, the company fulfilled the water department contract by buying quicklime in the open market. Any excess over the demand will be dehydrated and sacked for resale.

Three shifts are now producing from 150 to 160 tons of quicklime a day. Robert O. Stanley, president of the company, revealed that 70 tons of the output a day will go to the city's water-purification system.

(Continued on page 67)

Internal view showing manganese steel impact blocks, hammers and liners. Rugged, heavy steel plate construction. Extra large shafts are mounted in oversize bearings sealed in self-aligning housings.

Unequalled For Secondary Grinding

Reduces limestone and material of similar hardness to 1½", ¾" or smaller. Properly adjusted, the Williams Impactor makes excellent material with the proper percentage of fines for road base course. Unusually low upkeep expense as reduction is 100% by impact. Material is fed to enter between the hammers and is thrown against the impact blocks setting up a repeated ricochet action which accomplishes the reduction. Adjustable impact blocks adjust for wear. A reversing switch on motor permits rotating hammers in either direction, to the left today and to the right tomorrow, thereby giving double hammer life. No grates are used. Entire bottom is open permitting unobstructed discharge of crushed material and less wear and tear. A size for every job. Let us tell you about one for your use.

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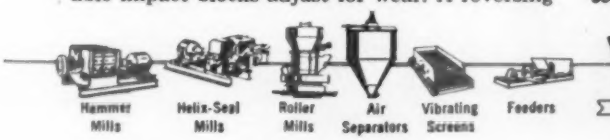

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Oldest and Largest Manufacturers of Hammer Mills in the World

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what wheelabrator® can do for you

Look at Wheelabrator's record of performance and successful installations collecting hot gases in glass baghouses. Since the first Wheelabrator Dustube® installation utilizing Glastube® filter tubes, made over 7 years ago, Wheelabrator has amassed an unequaled wealth of experience and know-how in designing custom-made baghouses using glass fiber tubes. Today, more than 4 million c.f.m. of hot gases are being filtered in Wheelabrator Glastube baghouses, using either the repressuring or shaking methods of bag cleaning. Wheelabrator Dustube Collectors embody many exclusive features that insure highest efficiency at lowest operating and maintenance costs. Collection efficiencies above 99% are regularly achieved. Input temperatures up to 550°F are accommodated in closed baghouses, and up to 650°F in open baghouses, without costly pre-cooling equipment.

Wheelabrator Dustube collectors offer the most practical solution to your problem of filtering hot gases from dryers, kilns or clinker coolers . . . the most favorable balance of equipment and operating cost to collection efficiency. For engineering consultation, write to **WHEELABRATOR CORP., 1281 S. Byrkit St., Mishawaka, Indiana. In Canada, P.O. Box 490, Scarborough, Ontario.**

Write for this illustrated report of Dustube Collectors serving in many normal and high temperature applications.

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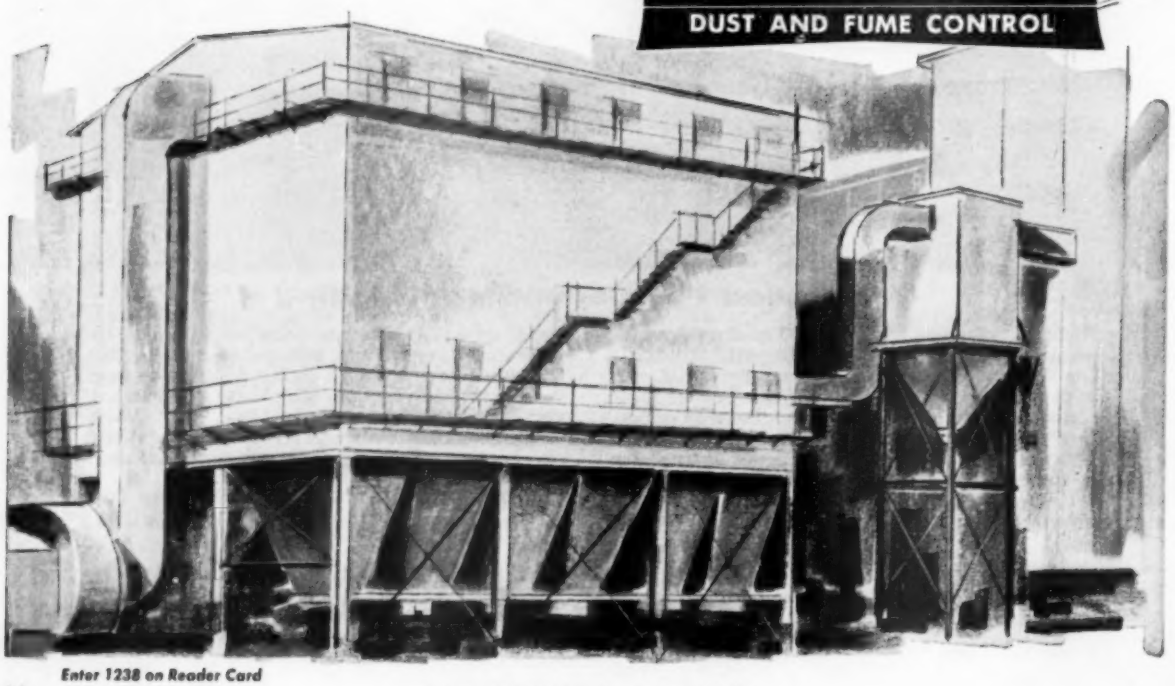
DUST AND FUME CONTROL



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(Continued from page 64)

Marquette dividends up at year's end

SHAREHOLDERS were paid 45¢ per common share by Marquette Cement Mfg. Co., Chicago, for the fourth quarter, holding to the increase from 40¢ per share voted in the third quarter. This brought dividends on Marquette common shares to $1.80 for the year against the $1.70 per share paid in 1959.

Receipts for the third quarter were $20.6 million, which represented a slight margin of some $30,000 above the like quarter last year. For the first nine months of the year, receipts amounted to $43.6 million on which a net income of $7.5 million, or $2.81 per common share, was realized. In the same period last year, receipts were $46 million and net income was $8 million, or $3.02 per common share.

W. A. Wecker, Marquette president, told shareholders that good progress had been made during the third quarter in reducing the shipment lag experienced in the first half of the year. The lag was 7½ percent at the end of September compared with 12 percent at the end of March.

"Unfilled orders for heavy construction work totalled 2-million bbl. at the end of the third quarter," he reported. "This was 661,000 bbl., or 46 percent more than at the same date last year."

Gravel pit is zoning issue

DARIEN, CONN., TOWNSPEOPLE have protested the use of a gravel pit in the city for processing materials that are hauled in by trucks. The Board of Selectmen have been asked to determine whether or not the Eljay Corp., which owns and operates the pit, is violating the zoning laws.

Although the main cause for complaint are the trucks that use residential-area streets, a committee has charged the company with violation of zoning ordinances that forbid manufacturing and processing in the area.

An appeal to the Governor of the state brought the reply that the problem was a local issue. Other access roads to the pit, the Eljay Corp. states, have been blocked by construction of the Turnpike that landlocks the property. The committee now has the situation under study in terms of traffic and safety.

(Continued on page 68)

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PAN ▸ TYPE truck bodies and trailers **14 to 45 TONS** dumped by EASTON electric overhead hoist

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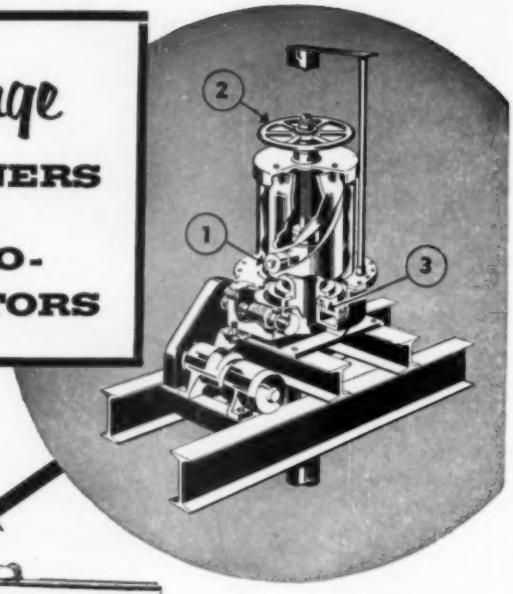
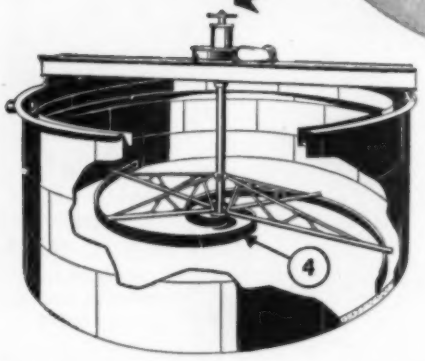




. . . for all clarifying, thickening and de-sliming operations.

For flotation concentrates thickening ahead of filtering—or for tailings disposal or reclamation, Hardinge Thickeners provide:

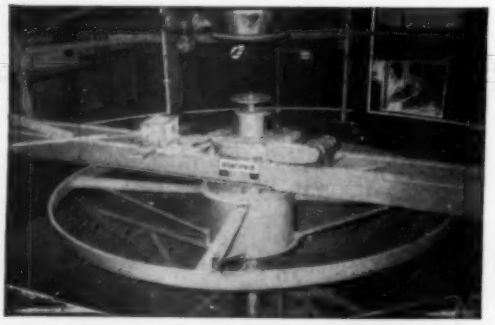
1. "Auto-Raise to avoid lost production from overlonds.

2. Manual or power raise to supplement "Auto-Raise."

3. Replaceable ring-type ball bearing support for rotating mechanism.

4. Spiral rakes for maximum underflow density.

Also available are froth rakes for froth-free overflow and superposed type tank construction for minimum floor space and building economy. Complete specifications on request. Bulletin 31-E-7.



A 35'-diameter Hardinge Superposed Thickener installation in a Canadian lead-zinc concentrator. The sludge outlet for the upper unit can be seen at the top of the picture. Note froth ring on lower unit.

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INDUSTRY NEWS

(Continued from page 67)

Sales decline at Bessemer

SALES OF $7.6 MILLION for the first nine months of 1960 were reported as below the like period last year by Bessemer Limestone & Cement Co., Youngstown, Ohio. Sales for the first three quarters of 1959 were reported at $9.2 million.

Frank Warren, Bessemer's president, said net income was $1.2 million, down from $1.4 million in the first nine months of 1959. Federal income tax to September 30, 1960, is $964,100.

Dividends paid shareholders were the same as last year—$1.50 preferred and 90¢ common.

Sales volume has been leveling out at about 80 percent of 1959, Mr. Warren commented, and will likely be the same for both years when the fourth-quarter figures are tallied.

END

STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, JULY 2, 1946, AND JUNE 11, 1960, (74 STAT. 208) SHOWING THE OWNERSHIP, MANAGEMENT, AND CIRCULATION OF

ROCK PRODUCTS, published monthly at Chicago, Ill., for October 1, 1960.

1. The names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher—Maclean-Hunter Publishing Corp., 79 W. Monroe St., Chicago 3, Ill.

Editor—George C. Lindsay, 79 W. Monroe St., Chicago 3, Ill.

Managing Editor—Charles R. Kluge, 79 W. Monroe St., Chicago 3, Ill.

Business Manager—P. D. Allen, 79 W. Monroe St., Chicago 3, Ill.

2. The owners are: Maclean-Hunter Publishing Corp., 79 W. Monroe St., Chicago 3, Ill., and Maclean-Hunter Publishing Co., Ltd., 481 University Ave., Toronto, Ont., Canada.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which the stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: 17,538.

P. D. Allen
Publisher

Sworn to and subscribed before me this 16th day of September, 1960.

[SEAL]

Clara M. Brockschmidt
(My commission expires March 16, 1964.)

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Leaders in limestone loading

These 93-M shovel twins are half of a Marion foursome that help keep hundreds of tons of limestone rolling out of this Illinois quarry every day.

Despite their size—both pictured machines carry 2-1/2 yard dippers—these massive diesel units have the built-in agility and short cycle time of smaller machines. Uncomplicated, muscle-multiplying Marionair control gives the operators wrist action control of all machine functions... lets them crowd, swing and dump in one smooth, fast operation.

Here are units that are big and strong in the right places to keep downtime at an absolute minimum... machines with a design simplicity that makes high maintenance costs a thing of the past... profit-oriented machines that will still be carrying their share of the load years from now.

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CALENDAR

OF COMING EVENTS

1961

January 17-19, 1961—National Limestone Institute Inc., 16th Annual Convention, Statler-Hilton Hotel, Washington, D.C.

January 17-20, 1961—National Crushed Stone Association, Annual Convention, Hotel Americana, Bal Harbour, Fla.

January 23-26, 1961—National Sand & Gravel Association, Annual Convention, Hotel Americana, Bal Harbour, Fla.

Jan. 29-Feb. 3, 1961—American Society for Testing Materials, Committee Week, Netherland Hilton Hotel, Cincinnati, Ohio

February 10, 1961—12th Annual Symposium on Geology as Applied to Highway Engineering, University of Tennessee, University Center, Knoxville, Tenn.

February 20-23, 1961—American Concrete Institute, 57th Annual Convention, Chase-Park Plaza Hotels, St. Louis

Feb. 28-Mar. 2, 1961—American Institute of Mining, Metallurgical & Petroleum Engineers, Annual Meeting, Chase Hotel, St. Louis, Mo.

March 5-8, 1961—American Road Builders Association, 59th Annual Convention, Atlantic City, N.J.

April 12-14, 1961—American Institute of Mining, Metallurgical & Petroleum Engineers, International Symposium on Agglomeration, Sheraton Hotel, Philadelphia, Pa.

April 18-20, 1961—American Institute of Electrical Engineers, Cement Industry Technical Conference, The Sheraton-Cadillac, Detroit, Mich.

April 27-29, 1961—Texas Aggregates Association and Texas Ready Mixed Concrete Association, 7th Joint Annual Convention & Equipment Show, Robert Driscoll Hotel, Corpus Christi, Texas

May 11-13, 1961—National Lime Association, Annual Convention, Grand Hotel, Point Clear, Ala.

June 25-30, 1961—American Society for Testing Materials, 64th Annual Meeting, Chalfonte Haddon Hall, Atlantic City, New Jersey.

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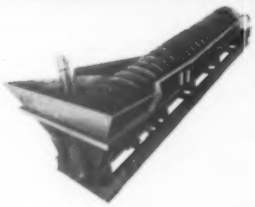
COMPLETE EQUIPMENT FOR AGGREGATE TREATMENT

SAND PREPARATION



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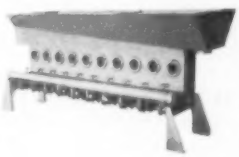

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Accurate sizing of sand into multiple fractions, and blending, for specification sand. Simple operation with maximum flexibility and control of each cell or compartment.

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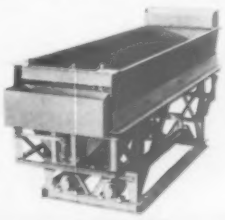

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HINTS & HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

Power for the quarry

SETTING UP temporary power lines for high voltages can be a troublesome problem. Not only must the supports be stable enough to stand up under wind and storm, but there is no opportunity to put power poles into the rock ledge. At the same time, the assembly must be readily dismantled and moved to another place in the quarry at short notice.

A southern crushed stone producer neatly solved this problem. Heavy blocks of concrete, about 1 cu. yd., are made with holes big enough for the butt of the creosoted power poles. The block is mounted on a wooden skid and moved into place with a truck or tractor loader. The pole is put into the block and the power lines installed. The heavy weight of the concrete provides stability for the assembly.

When the setup is to be moved, the process is reversed. Cable and poles are taken to the next site and the concrete blocks trundled away on their skids.

Photoelectric cells

SLOWLY BUT SURELY rock products producers are getting the knack for using many of the wonders of this electronic age. A great number of cells have been set up to be actuated by trucks to control stop lights, sound alarms or to help weighmen jockey trucks on scales.

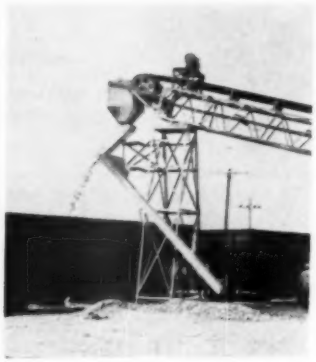
Several portland cement producers have adapted the idea. One producer in the west uses a heat-sensitive cell to signal when the kiln is radiating too much heat. This sounds an alarm and the kiln burner goes into action. A number of cement plants as well as crushed stone quarries and processing plants use a cell to turn on the bright lights at sundown.

Another portland cement producer has gone one step further. His lights go on and off from dusk to dawn in a carefully calculated sequence, all triggered by the photoelectric cell.

Packaged feeder

A WESTERN CEMENT PRODUCER has designed and built an ingenious combination of apron feeder with a self-contained storage hopper. The entire assembly is simple and sturdy, yet light enough to be picked up with a crane.

The storage bin is circular, with a yoke at the top for a crane hook. A shed roof protects the apron from the weather at the same time it protects an operator and machinery from falling rock. The apron itself is mounted in an I-beam frame welded to four substantial columns. Plug-in controls are secured to one of these legs. Lights, access ladder and manually controlled gates complete the packaged feeder assembly.



Swivel chute for rail cars

IT'S OFTEN TOO MUCH TROUBLE OR expense to rig up controls to start and stop conveyors loading rail cars. Instead, a middle-western crushed stone producer accomplished the same thing by combining a fixed chute and a swivel chute at his car-loading station.

While the cars are loading, the chute directs material into them and the swiveling movement helps to trim the load. But for the short interval while the next car is moving into place, the swivel chute diverts stone to a fixed chute at the side of the track. When the accumulation of rock gets too big, a tractor loader moves in and hauls the aggregates back to storage piles.

As a result, the operator is not concerned with the operation of the belt conveyor: He watches only the material going into the car.

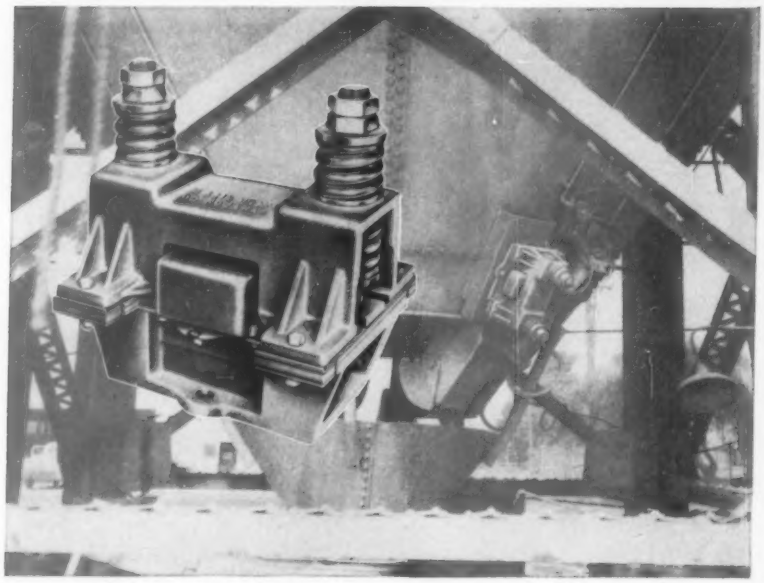
Speedy loading

WESTERN PRODUCERS regularly come up with ingenious ideas for economical operation. One has come up with a combination of elevating scraper and belt conveyor loader to put 45-ton loads of overburden into trucks. The truck moves under the extended conveyor to catch the material as it is discharged. As the truck is filled, the operator trims the load by moving just a little faster than the digging rig.

END

SYNTRON cost-cutting equipment of proven dependable Quality

keep bins and hoppers free-flowing



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BIN VIBRATORS

. . . prevent arching and plugging of sand, aggregate, gravel and heavy stone in bins, hoppers and chutes—keep these materials flowing freely to process equipment.

Simplicity of design assures dependability of operation and low maintenance. They are electromagnetic units that produce 3600 powerful, instantly controllable vibrations per minute. Enough vibration to move the most stubborn material.

SYNTRON Bin Vibrators provide the most efficient and effective method of keeping bulk materials free flowing. Eliminate equipment damage by hazardous pounding and rodding.

SYNTRON Bin Vibrators are available in a wide range of sizes. They are easy to install, easy to operate and easy to maintain. Eliminate production slow-downs caused by sticking and clogged bins.

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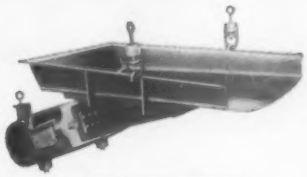
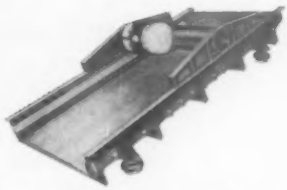
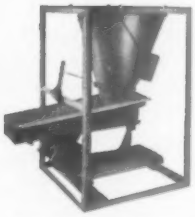


VIBRATORY FEEDERS



VIBRATING SCREENS



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FOR 1961

619 NEW MODELS! All engineered with one idea in mind... economy! New "Big Six" engine for 2-tonners plus five Cummins diesels for the new H-Series tractors expand the proven line of Ford engines to 18—with one just right for your job. A wider-than-ever choice of transmissions and axles. And . . . on all 1961 Ford Trucks, each part, except tires and tubes, is now warranted by your dealer against defects in material and workmanship for 12 months or 12,000 miles, whichever occurs first. The warranty does not apply, of course, to normal maintenance service or to the replacement in normal maintenance of parts such as filters, spark plugs and ignition points.

FORD TRUCKS COST LESS

YOUR FORD DEALER'S "CERTIFIED ECONOMY BOOK" PROVES IT FOR SURE!

New! Durable Tandems

Ford's Tandem Axle trucks for '61 are engineered to give you greater flexibility and significant payload advancements. Your choice of 22,000-lb., 28,000-lb., 30,000-lb., 34,000-lb., or 38,000-lb. axle capacity. New, longer wheelbases are available to permit installation of special bodies up to 21 feet long. Aluminum walking beams as well as aluminum wheels and gas tanks are optional for reduced chassis weights.

FORD DIVISION, *Ford Motor Company*

New! "Big Six" Engine

More power for America's savingest 2-ton trucks . . . a big 262-cu. in. Six with the performance of big displacement, the durability of heavy-duty construction, plus the gas economy of 6-cylinder design! Available early 1961. You also get improved riding comfort with new smoother-acting springs and a sturdy truck suspension system that can give up to twice the front tire life of some other makes.

New! H-Series Diesel- or Gas-Powered Tractors

Ford's new H-Series tractors with 28-inch front axle setting and 82-inch BBC are offered in four single-axle and four tandem-axle models with over 500 engine-axle-transmission combinations. Choose from ten industry-accepted engines—five Cummins diesels and five Ford Super Duty V-8's!

New 100,000-mile warranty on Super Duty V-8 gas engines is most liberal in the industry. On 401-, 477- and 534-cu. in. V-8's, Ford Dealers will replace any major engine part (including block, heads, crankshaft, bearings, valves, pistons, rings) found to be defective in materials and workmanship in normal on-highway use. Warranty covers full cost of replacement parts for 100,000 miles or 24 months, whichever occurs first . . . full labor costs for first year or 50,000 miles, sliding percentage scale thereafter.

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GENUINE PARTS
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SERVICE
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NATIONWIDE SERVICE . . . *look for this sign at Ford Dealers' across the country, for service on all Ford gas and diesel trucks!*

New! Extra Heavies

Double-channel truck frames and single-channel frames of high-tensile steel for tractor models give proper strength with minimum weight. Wider power train choice, 28-inch front axle setting plus new high-durability cabs and sheet metal mean greater earning power for you.

New! 4-Wheel Drive Pickups

Ford offers the lowest-priced* 4 x 4 with big 8-ft. box. And these models have the traction to go most anywhere . . . road or no road! You can choose either the gas-saving 135-hp Six or the 160-hp V-8 that gives extra power with "six-like" economy.

**Based on a comparison of latest manufacturers' suggested retail delivered prices*

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ANNOUNCING LE ROI'S

A new line of powerful . . . highly portable.

THE LRD-2

Here's a highly portable blasthole drill for making hole up to 4½ inches as deep as 30 feet . . . equipped for either positive-drive rotary drilling or powerful down-the-hole percussive drilling.

What's more, the LRD-2 is completely self-contained . . . and economically priced, too!

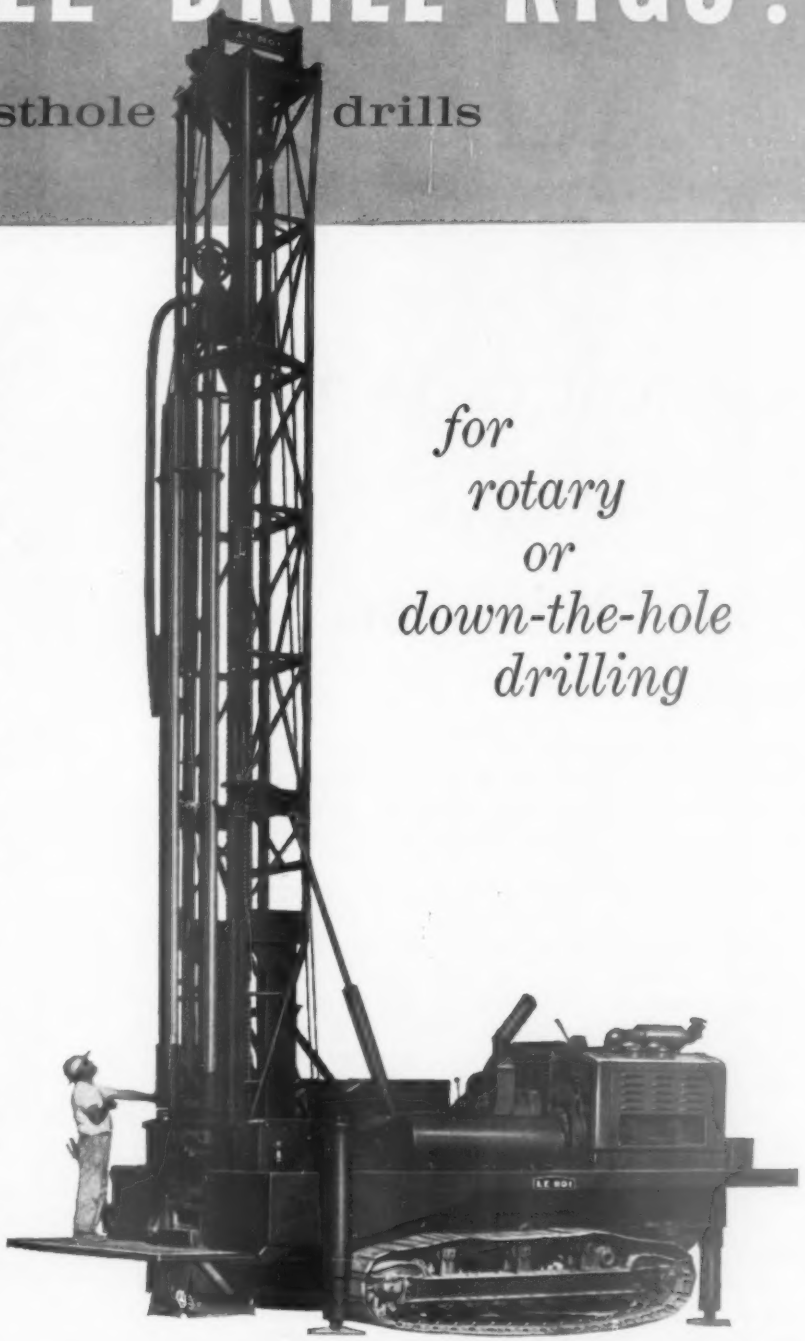
The entire unit is easily handled by one man. Controls are conveniently grouped at an operator's station located alongside the drilling area. The unit can be moved, leveling jacks hydraulically set, boom hydraulically raised, drill pipe and bits connected, and hole started — all with a few non-fatiguing motions.

Powerful direct mechanical drive keeps the rotary table turning — won't bog down or lose torque under rough going like air or hydraulic driven units — eats through tough rock formations under 10,000 lbs. pulldown pressure at speeds from 40 to 250 rpm. If necessary, a hard-hitting down-the-hole drill can quickly be substituted for the rotary bit to drill extremely hard rock formations. A Le Roi 25 hp two-stage air compressor provides ample air for powering the down-the-hole drill and cleaning out hole . . . or is available in single-stage where only rotary drilling is necessary.

The self-propelled LRD-2 is available either on crawler or tire mounting and with either gasoline or diesel power unit. A whole list of extra equipment is available to ease or speed drilling, including lights for night-time operation, a mounted bit grinder, air hoist, breakout tongs, water injection system, etc. . . . all detailed in Specification Sheet AT-146. Write for your copy.

DEEPHOLE DRILL RIGS!

rotary blasthole drills



for rotary or down-the-hole drilling

THE LRD-3

Here's the *big* rig . . . completely self-contained for putting down hole as large as 7⅞ in. to 100 ft. depth!

The LRD-3 is available with either crawler or truck mounting. An enclosed cab can be furnished to provide all-weather protection for the operator while drilling. All controls are conveniently grouped for easy operation and good visibility.

The traveling head design of the LRD-3 provides positive mechanical power without excessive torque loss under heavy pulldown, and permits easy control in making up and breaking down drill-rod. Every function of the unit is designed to speed productive drilling and keep the operator making hole. Leveling, raising the mast, and even the automatic drill pipe magazine are hydraulically controlled for speedy operation. A powerful dust collector traps cuttings and blows them well away from the unit.

An extra-sturdy 4-speed chain-hydraulic pulldown puts up to 30,000 lbs. of pressure on the bit of the LRD-3. A rugged dual-range transmission provides rotary speeds from 9 to 168 rpm in a selection of 10 forward and 2 reverse speeds.

Where needed, the rotary bit can be quickly changed for a powerful down-the-hole drill. A Le Roi 100 hp dual-manifold air compressor provides plenty of 100 psi air for punching through tough rock with the down-the-hole drill, or it can be set to deliver 625 cfm of 40 psi air for fast, efficient removal of cuttings in rotary operation.

The LRD-3 comes complete with a hydraulically operated magazine with capacity for four 20 ft. drill pipes, and can be equipped with optional convenience equipment similar to the LRD-2. Specification Sheet AT-147 describes the unit in detail, with complete spec information. Send for a copy.

LE ROI

division of Westinghouse Air Brake Co.

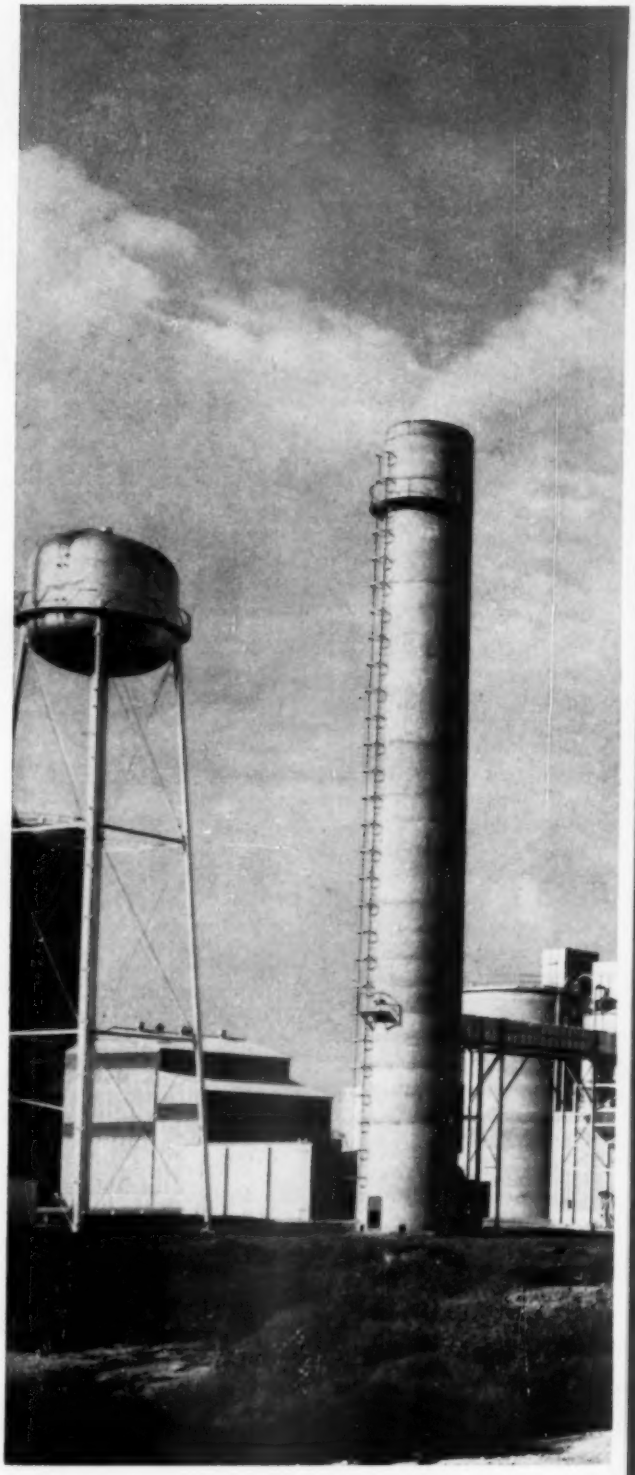
Sidney, Ohio

ROCK PRODUCTS

December 1960

Efficient new plant springs from enterpriser's vision of growing market and boundless natural resources

Cement capacity booms in Oklahoma



by Elwood Meschter

OKLAHOMA CEMENT CO. is the newest producer in the portland cement industry. But when it built a new plant at Pryor, Oklahoma, it demonstrated the speed and proficiency of a veteran in the business.

True, the organizers of the company are veterans in their own fields. A group of Oklahoma business men—bankers, oilmen and investors—visualized a market for cement and organized the company early in 1959. Realizing that they knew little about the intricacies of cement plant design, they engaged a design engineer and contractor who did.

Successful result of their decision is a sparkling new dry process cement plant built at the phenomenally low cost of about $6.40 per annual bbl. First shipments of cement from the $8-million installation were made in July, 1960—scarcely 17 months after groundbreaking. Already the 1¼-million bbl. capacity of the new plant is channeling its output into the Keystone & Eufala Dams. As the company achieves a foothold in the market, it will expand its sales area into Arkansas, Texas and Missouri.

The new plant is run with battleship efficiency even in the first few weeks of operation. And the simple, straightforward flow of materials from quarry to packhouse helps to do this. Belt conveyors speed supplies of hard shale and limestone

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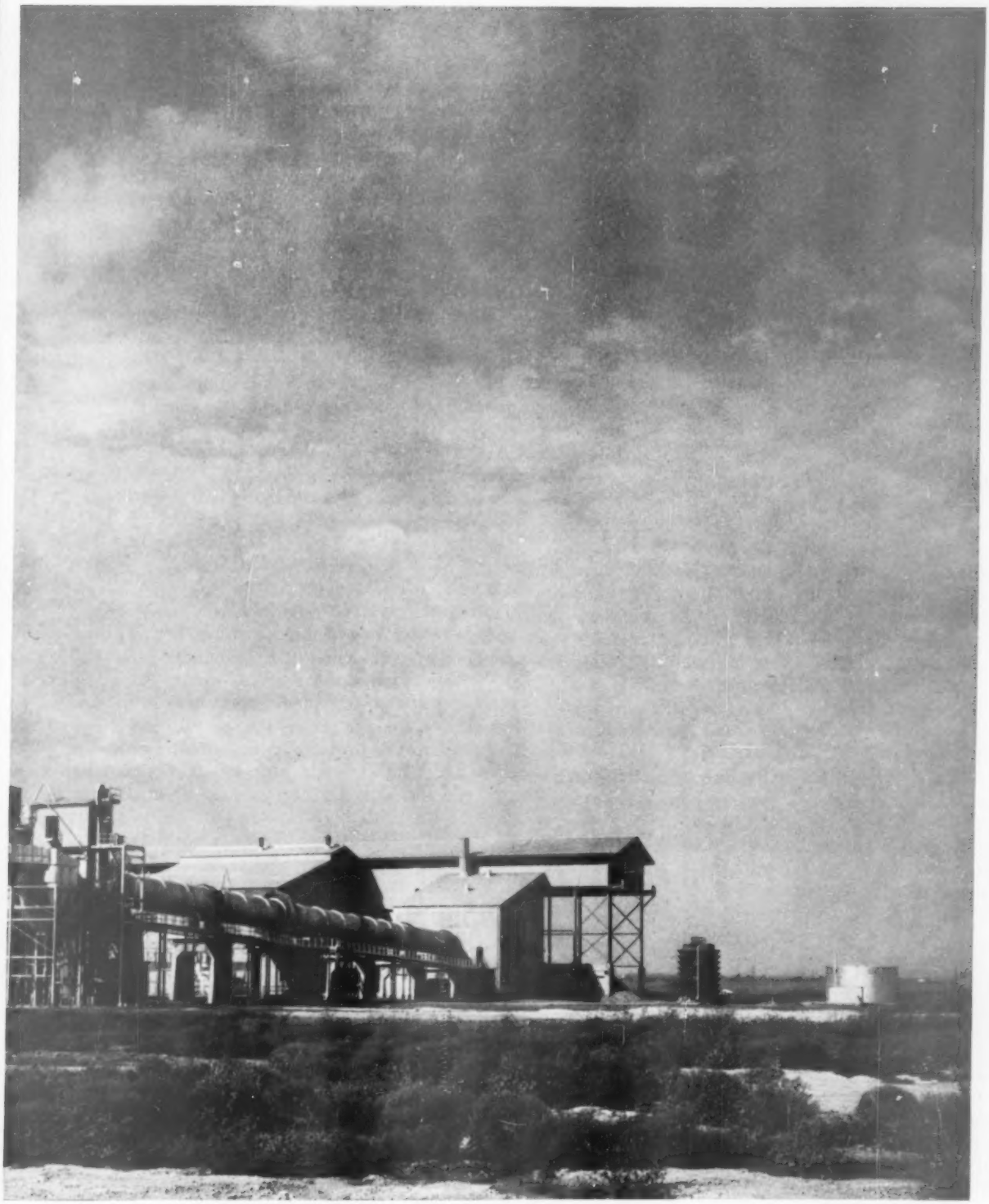

THERE'S PLENTY of wide open space at the new plant to add another kiln and to extend the storage building

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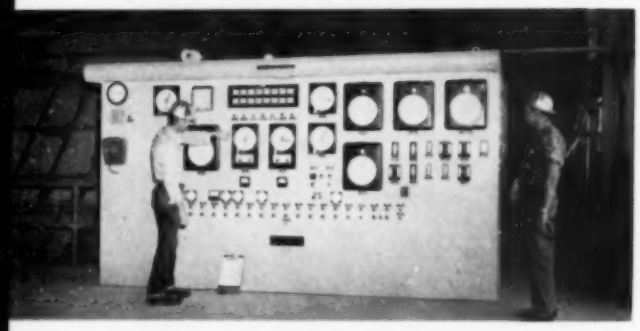


A KILN-CONTROL CENTER is tooled to record and control burning conditions in the big 11 x 375-ft. gas-fired kiln

from the high-capacity crushing system to the plant's storage building. Supplies of these raw materials are adequate for centuries of continuous high-capacity operation of the big gas-fired kiln.

Both the shale stripping and the newly opened limestone quarry in the Grand River formation are less than 500 yd. from the crusher building. A 2½-cu. yd. shovel is teamed with a pair of 20-ton end-dump trucks to bring material to the big 50 x 50-in. primary hammermill. Normally, one day a week stripping shale and three or four days a week in the limestone are needed to keep ahead of the raw mill.

Fines are stripped out of the flow of quarry-run material—either shale or limestone—by a wobbler feeder ahead of the 50 x 50-in. hammermill. These fines drop to the foot end of a belt conveyor to form a cushion of fines for the crushed material. An apron conveyor under the hammermill is a design refinement that improves belt conveyor efficiency. This 42-in. apron breaks the impact of material as it comes pouring out of the bottom of the hammermill and deposits it gently on the bed of material already on the inclined belt conveyor.

The flow of raw materials to the storage building is interrupted only by a 5 x 14-ft. vibrating screen that sends plus ½-in. material back to the hammermill. This double-deck screen is fitted with a top deck with 2-in. sq. clear openings to protect the fine screen on the lower deck from the impact of the rare piece of oversize.

Nor was expansion overlooked in the drive for quick completion of an efficient installation. One or more kilns can be quickly added to the layout with modest investment—the stack and ductwork is ready. The mill building can be easily extended for more mills, while the storage building can be lengthened in two directions. However, the first expansion will probably take place in the raw materials handling system. The original designs have auxiliary storage piles laid in to allow segregated storage of crushed limestone and shale. The reclaim system will then tie into the existing conveyor system. In this way a large and continuous supply of raw materials to the mill storage building will not depend entirely on continuous operation of the quarry.

Also in the future is a 70-tph. shale handling system. This will be independent of the existing dual-purpose system and will be complete with its own primary and secondary hammermills, screens, recycle system and storage piles.

Attention to design details helps to maintain efficiency. The final belt conveyor is equipped with a traveling tripper that can distribute limestone or shale along the side of the storage building. This frees the 3½-cu. yd. overhead crane to keeping the mill feed hoppers full of material.

Another useful feature at the new plant is the installation of a truck dump hopper and bucket elevator that puts gypsum, sand, iron ore or other materials over the edge of the concrete retaining wall within reach of the overhead crane. These are trucked into the new plant from local suppliers.

A clay or shale dryer boosts ball mill efficiency. The shale in the property is rock-hard and dense when dry. But it could accumulate undesirable moisture during the winter months or in a rainy season that would slow its progress through the raw mill. The plant's designers figured that the Btu.'s spent on drying would produce better mill performance as well as more consistent results.

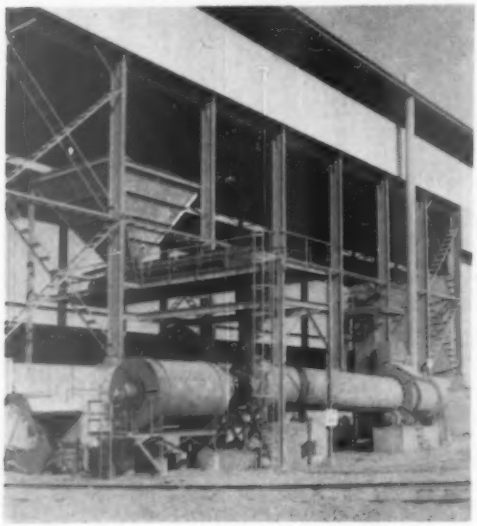
The overhead crane puts clay, shale or loam to be dried into a 50-ton hopper fitted with an apron feeder. After passing through a 6 x 50-ft. concurrent flow dryer, the finished material is put back into storage with a bucket elevator.

Milling efficiency is achieved in two practically identical mill circuits. Both of the 11 x 20-ft. two-compartment mills are set up to grind clinker; but one of the mills normally grinds kiln-feed materials and has extra feeders for raw material and a big furnace tied into the air separator. This will be its exclusive assignment until its own air conveyor system is installed to take cement to storage.

This swing mill is equipped with five weighing feeders with variable speed controls. The biggest unit in this group has a capacity range between 8 and 40 tph. and is used for feeding either lime-

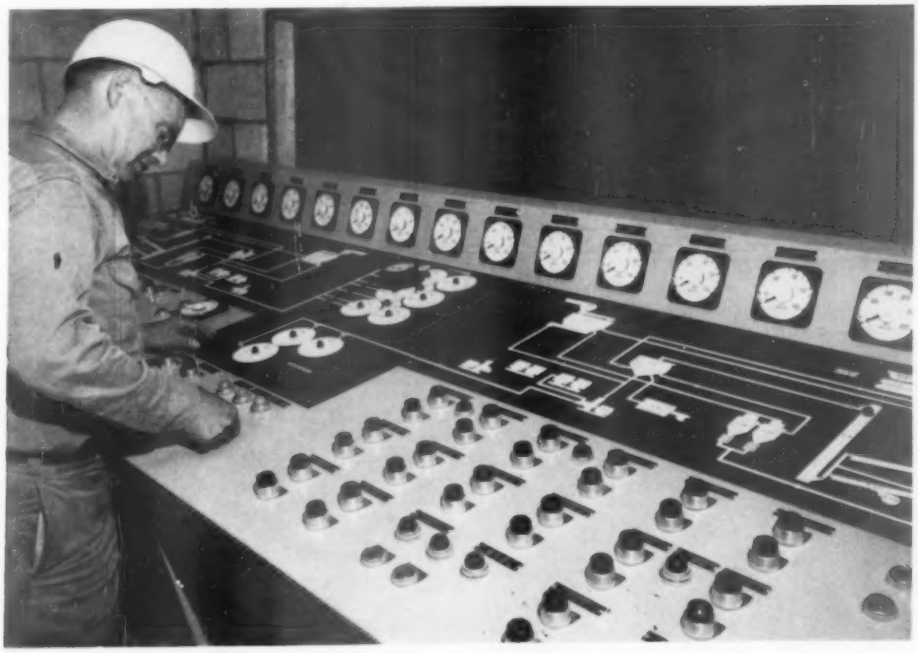
Please turn page

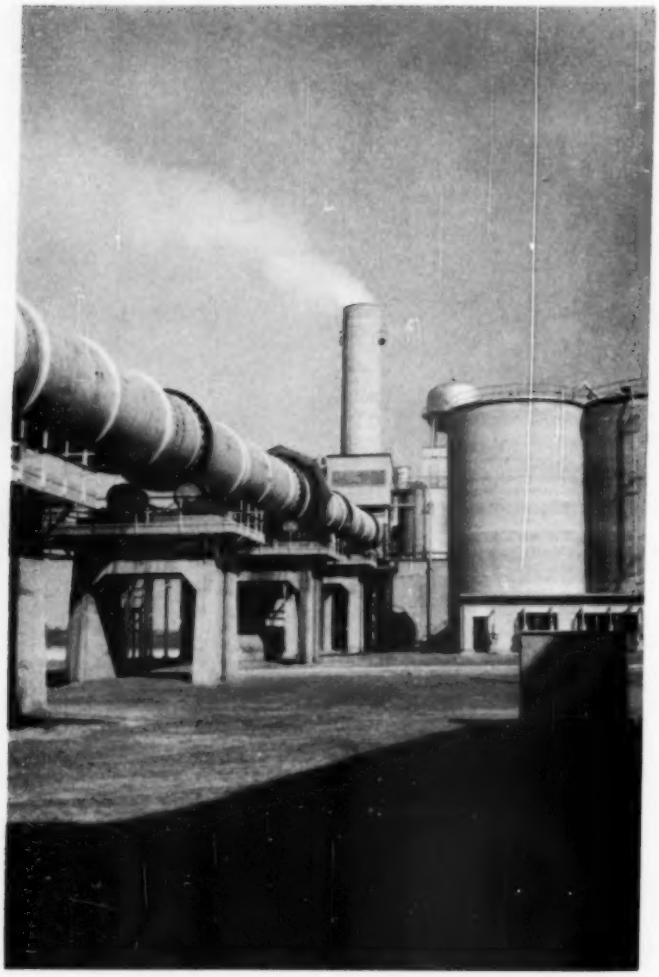
RIGHT: Final conveyor has a traveling tripper to distribute shale or limestone into storage within reach of a 3½-cu. yd. overhead crane bucket



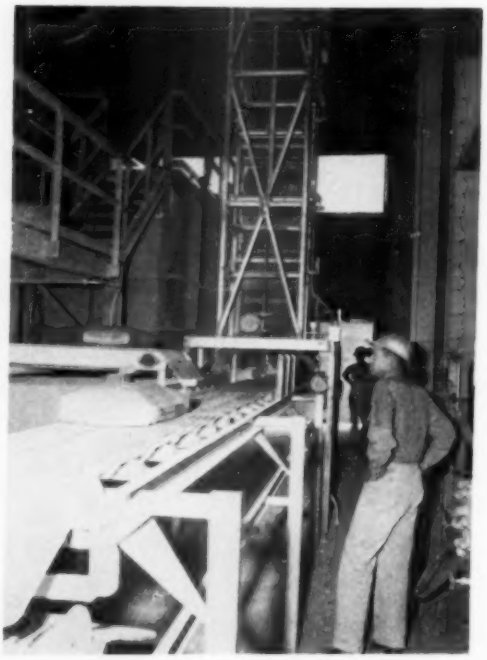
ABOVE: Ball mill efficiency is improved during the winter when this clay and shale dryer is in operation

BELOW: This control center in mill building lets an operator supervise flow of material from storage building, through mill circuits and into storage silos
Oklahoma Cement photo



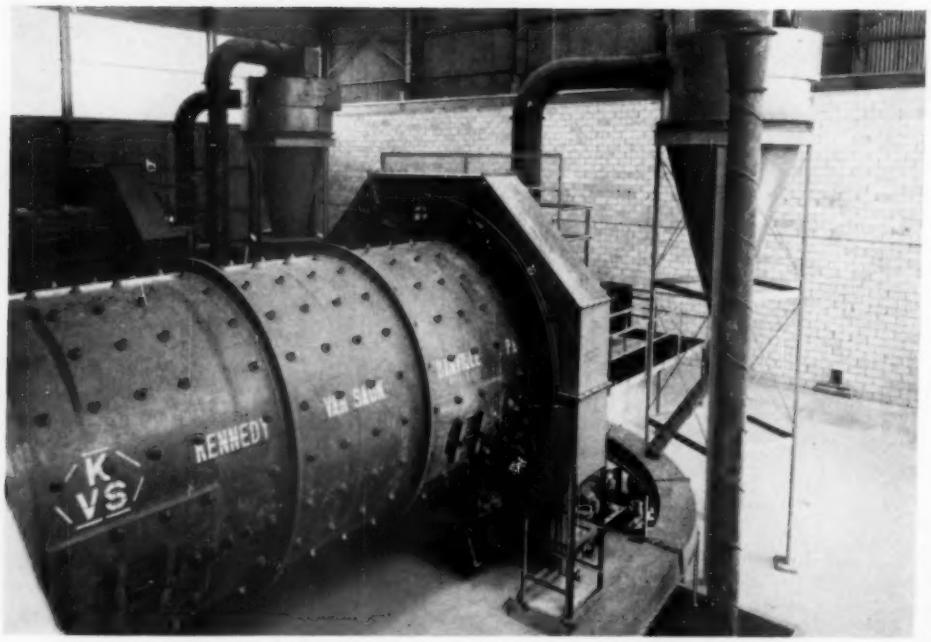


LEFT: Three storage silos (right) hold raw materials ahead of the kiln feed silo



ABOVE: Flexible conveyors speed bagged cement on its way to truck or rail cars

BELOW: Pre-cleaner cyclones scalp airborne oversize from stream of air through 11 x 20-ft., two-compartment mills
Oklahoma Cement photo



continued from page 81

stone or clinker to the gathering belt that loads the mill. Another of the five feeders handles only iron ore, another only shale. The two smallest feeders handle clay and gypsum at rates between 1 and 5 tph. (for gypsum).

Both mills are partially air-swept to reduce the loading in the 16-ft. air separator in each mill circuit. A precleaner cyclone in each air circuit strips out air-borne oversize to protect the big bag collectors. Oversize is returned to the mill circuit and fines end up in the pneumatic conveying system going to storage silos.

The primary mill circuits are designed for about 600 percent recirculating load—about 270 tph. of material. Mill discharge drops to an airslide for the short trip to the boot of a bucket elevator that lifts everything to the air separator high in the top of the mill building. Oversize from the separator is chuted back into the mill, while accepted fines are dropped to the feed hopper of the pneumatic handling system for the trip to storage.

One mill does finish grinding only. It has three weighing feeders with variable speed drives under its supply hoppers. These feeders discharge to an inclined belt conveyor that puts cement-making materials into the mill. The head end of this conveyor has a tank and ferris wheel feeder to supply admixture for the times when the mill is making air-entraining cement.

Kiln feed raw materials are pumped to one of three concrete storage and blending silos holding about 1,400 tons each. With three units in the storage system it is possible to be filling one tank, blending in another, while the third is discharging to a 250-ton kiln feed silo through a constant-level feed box. This feed silo is also fitted with compressed air mixing valves to keep the materials agitated while they are being fed to the kiln.

The 11 x 375-ft. gas-fired kiln is fed through a constant head feeder and screw conveyor system. This uniformly fed material is supplemented with dust that is returned to the system from the dust collecting cyclones, from the kiln hood housing and from a dust chamber ahead of the cyclones. A screw conveyor system gathers the dust and drops it into the boot of a bucket elevator to be lifted to the top of the kiln feed pipe.

Fuel for the kiln is cheap and plentiful in eastern Oklahoma. A natural gas pipeline taps local transmission lines to bring gas into the plant. Local suppliers can replenish a big tank of Bunker C oil that is a standby fuel.

Kiln discharge drops to a 6 x 37-ft. horizontal grate cooler. All clinker and clinker dust is collected by a drag chain conveyor and moved to the boot of a bucket elevator that lifts everything over the concrete retaining wall of the storage building. Here, the clinker is distributed into storage by the overhead crane.

Cement from the finish mills is stored in one of the six silos in the battery that can hold about 138,000 bbl. of finished cement. Each silo is equipped with quadrant aeration units, and each discharges to one of three parallel airslide systems. One system supplies the rail loading station, another the truck loading station, and the third supplies cement to the packhouse.

The packhouse is equipped with two 4-spout bagging machines that can each turn out 24 bags per min. Each bagging machine discharges to a flexible conveyor system that sends bags to the truck loading dock, to rail car loading, to a palletizing machine or to bag storage.

Spill and packhouse dust is carefully collected and returned to surge bins. An airslide under each bagging machine collects spill and takes it to the boot of a bucket elevator to be lifted to the overhead bins. Dust from each of the two big bag collectors and the small cyclones in the packhouse is also discharged to the elevator to be returned to the system.

The Pryor plant was designed and built by George A. Fuller Co. A. J. Anderson was consulting engineer and is now vice president and general manager of Oklahoma Cement Co. **END**

MAJOR EQUIPMENT REFERENCE

Quarry trucks, 20-ton (2)	Euclid Div. GMC
Quarry Shovel, 2½-cu. yd.	Northwest Engineering Co.
Hammermill, 50 x 50-in.	Hammermills, Inc.
Wobbler feeder, 48 in. x 18-bar	Hammermills, Inc.
Belt conveyor system	Link-Belt Co.
Bucket elevators (1)	Link-Belt Co.
Apron feeders	Link-Belt Co.
Screw conveyor system	Link-Belt Co.
Clay dryer, 6 x 50-ft.	Kennedy Van Saun Mfg. & Engr. Co.
Kiln, 11 x 375-ft.	Kennedy Van Saun Mfg. & Engr. Co.
Mills, 11 x 20-ft., 2-comp. (2)	Kennedy Van Saun Mfg. & Engr. Co.
Horiz. grate cooler, 6 x 37-ft.	Fuller Co.
Clinker breaker	Fuller Co.
Pneumatic conveyor systems	Fuller Co.
Airslide conveyors (18)	Fuller Co.
Compressors (8)	Fuller Co.
Dust collectors, kiln (2)	Buell Engineering Co.
Dust collectors, mill (2)	Rees Blow Pipe Mfg. Co.
Dust collectors, (8)	Western Precipitation Corp.
Fans, mill (2)	Rees Blow Pipe Mfg. Co.
Fans, kiln	Spencer Turbine Co.
Fans, cooler (2)	New York Blower Co.
Fans, stack	Buffalo Forge Co.
Bag conveyor system (2)	Power Curve Conveyor Co.
Motors & electrical equipment	Allis-Chalmers Mfg. Co.
Bagging machines (2)	St. Regis Paper Co.
Overhead crane, 3½-cu. yd.	P&H, Harnischfeger Corp.

QUICK LOADING of dry-crushed aggregates is possible by taking blended materials directly from a storage belt conveyor

TRUCKS waste no time getting full loads of sand from a 600-tph. bin with 16 gates. Two trucks can be loaded at once

Kern Rock Co.'s carefully planned storage and load-out system keeps aggregates flowing smoothly and swiftly to customer

Traffic control steps up shipping efficiency

by John H. Bergstrom

PEAK PERIODS IN SAND AND GRAVEL PLANTS can resemble a city freeway during the rush hour. Hence, it was only a matter of sound engineering for the designers of the Kern Rock Co. plant south of Bakersfield, Calif., to make traffic control a basic ingredient of their plans. Now there's never a hitch in the operations that make and ship 13 products (five sizes of washed rock, five of dry crushed material and three of sand) from the new 450-tph. plant.

Efficient planning of this installation began with Dan Sill, Kern Rock's founder, shortly before his death in 1959. In collaboration with John Park, plant manager, the project got under way when reserves began to scrape bottom at the company's Cottonwood Creek plant. Besides the shortage of good rock, the old plant's capacity was no longer sufficient to meet a fast-rising demand for aggregates in the Bakersfield area. Mr. Park recalls that the first drawings were made on butcher paper. He points to the smooth installation that resulted as a blend of the theoretical and practical. "Dan Sill was a dedicated engineer," he says. "Even when he was hospitalized after a heart attack, he kept in daily touch with the progress of construction on the new plant."

One might well consider the Kern Rock plant a lasting tribute to its founder. Today, storage and load-out facilities handle traffic in an orderly and efficient manner. Its built-in flexibility makes it possible to blend and ship almost any type of material without disrupting normal plant routines. With special blends becoming more and more in demand, such flexibility could easily be the key to expanding markets in the future.

Heart of the storage system is located in 10 cylindrical steel bins with a 350-ton capacity. They provide space for five sizes of crushed rock and five sizes of concrete aggregates.

Steel bins were given the nod over the more common concrete bins or open-ground storage because of their greater compactness. To obtain the same amount of live storage that steel bins offer, concrete bins would have been even more wasteful of space since they would require separation to prevent segregation and product contamination. "The extra cost of the steel bins," says Mr. Park, "is almost offset by savings on shorter conveyors. The reclaim belt is much shorter; also, only two conveyors are required to carry material to the sizing screens mounted above the bins."

There's another advantage: Because of the compact bin arrangement, only two very short conveyors are required to move material between the drying screens. Products from the four screens drop directly into the bins.

At times, ground storage is used to handle an anticipated demand for large quantities of a particular size, or because an imbalance in the pit temporarily yields an abundance of a certain size.

A concrete reclaim tunnel runs under the storage bins. The 30-in. conveyor, fed by manually controlled chutes, carries material to the loading area. The chutes are controlled from the truck-loading position. Although they are manually operated, the chute openings can be pre-set to insure consistent blending to a particular specification.

Dry crushed material is conveyed from storage and loaded directly into trucks. The belt from the reclaim tunnel assures rapid loading. It draws

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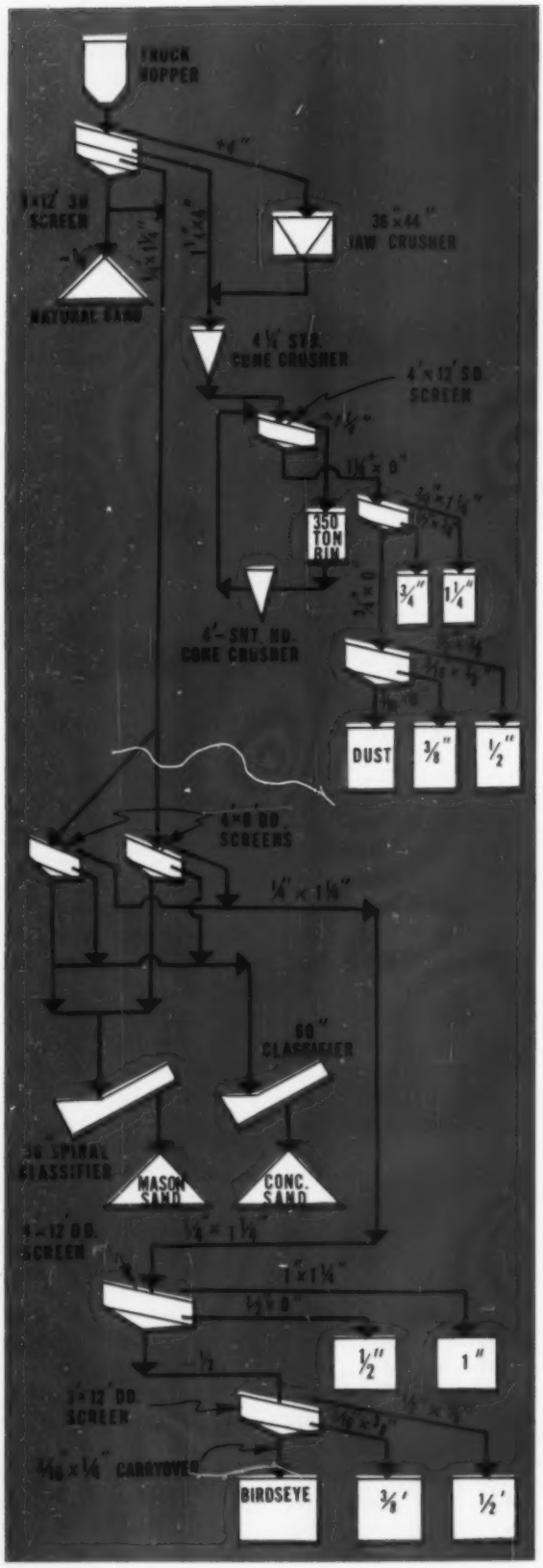

STEP UP SHIPPING EFFICIENCY . . .

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washed aggregates from storage, too. They aren't loaded directly, but first pass over a single-deck washing screen. This rewashing eliminates degradation material and any clay or slimes that may have remained after the first washing. No attempt is made to reclaim fines passing through the $\frac{3}{16}$-inch screen.

One spray bar from the screen is aimed at the return side of the belt. It washes off any fines that may still be clinging to the belt, thus drastically reducing the frequency with which the reclaim tunnel must be mucked out.

A belt conveyor carries the rewashed rock to six, 120-ton, steel load-out bins. Material may be placed in any of the six bins or, if necessary, chuted directly to a truck waiting alongside. Bins are arranged so that two trucks may load at the same time.

Storage and loading facilities for concrete sand are just as efficient. A swing conveyor mounted on top of the rock storage bins receives the washed sand and transfers it to a 3,000-ton stockpile. Wet material is dropped to one side of the pile and allowed to drain, while dry sand is worked into a chute on the other side of the pile. This eliminates any problems of arching or hang-up that would be encountered in handling wet sand. Draining the sand also keeps water out of the tunnel below the stockpile.

A 24-in. belt carries sand from the stockpile to a 800-ton bunker. This bunker also can accommodate two trucks simultaneously—16 gates assure rapid loading. The bunker is mounted on concrete piers which help eliminate the twisted steel legs often resulting from contact with a heavy truck.

Mason sand, for which there is not enough demand to justify extensive loading facilities, is handled by a front-end loader from ground storage. A second loader handles unwashed sand.

The new pit contains enough high-grade material for all foreseeable future needs. In drilling the plant's well, gravel was encountered to a depth of over 1,100 ft. The deposit lies under 4 or 5 ft. of overburden, but there is a ready market for this material as fill.

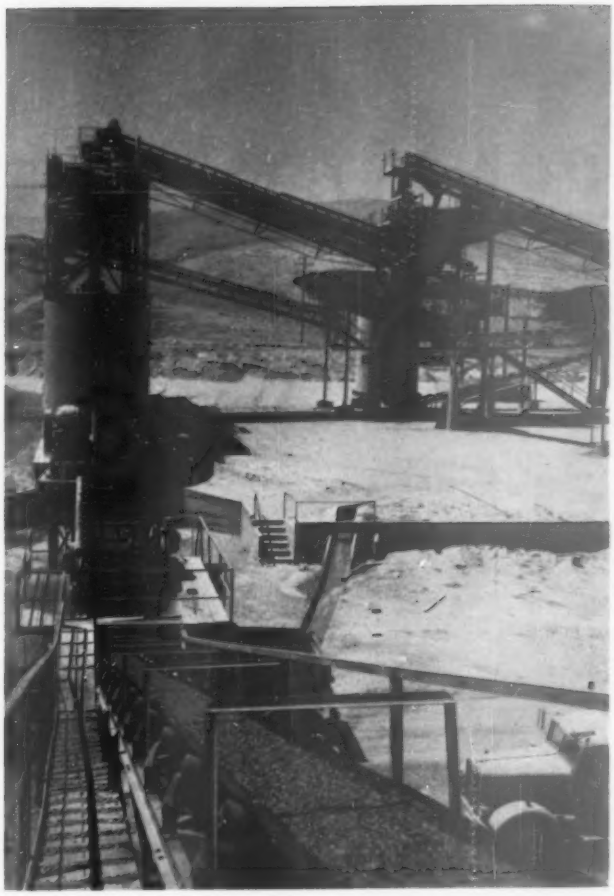
Gravel processing begins when two 20-ton rear dumps are filled by a 2½-cu. shovel for the 1,000-ft. haul to the plant. Material from the truck hopper is conveyed to a 5 x 12-ft. triple-deck vibrating screen. This was originally a double-deck unit, but a surplus of sand in the pit forced addition last winter of a third deck.

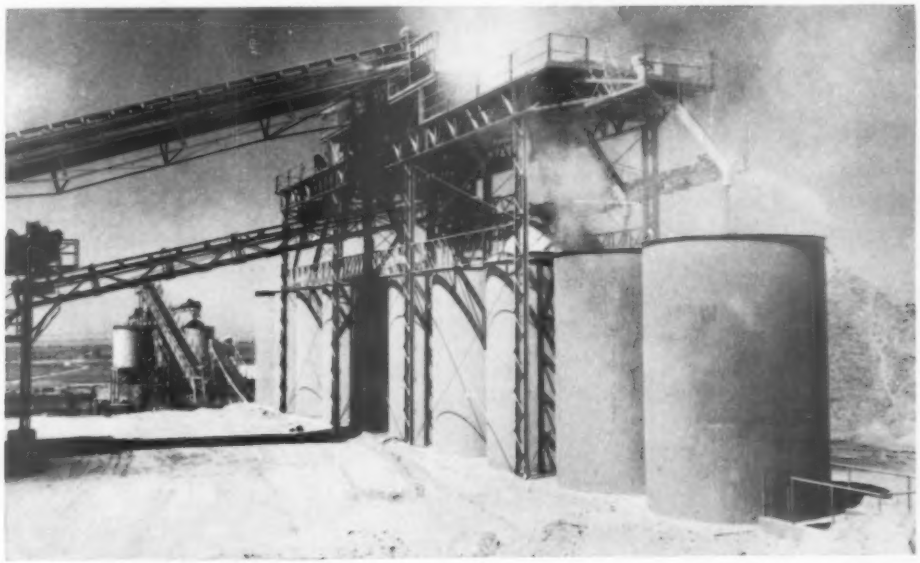
Please turn page

RIGHT: Ten steel storage bins (background) hold sized aggregates ready for shipping. A rinsing screen puts material in a belt (foreground) leading to a shipping bin

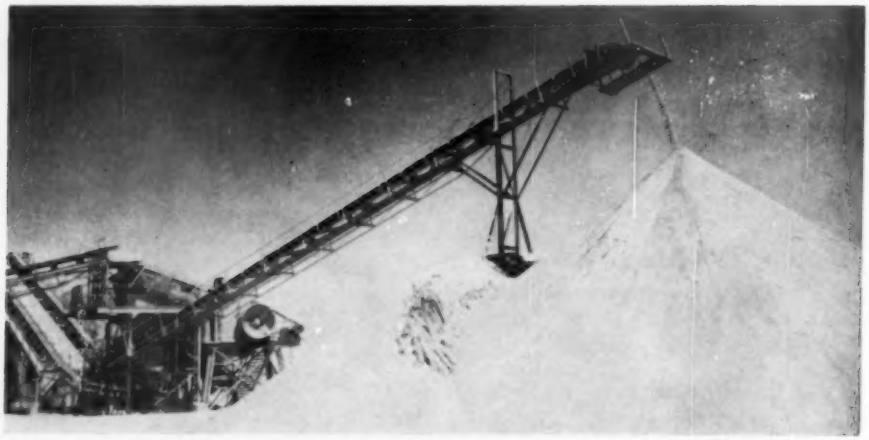
ABOVE: The heart of the natural aggregates preparation system is the machinery in this tower—vibrating screens and sand preparation equipment

BELOW: High-speed production is needed to keep this bank of ten 350-ton steel storage bins full

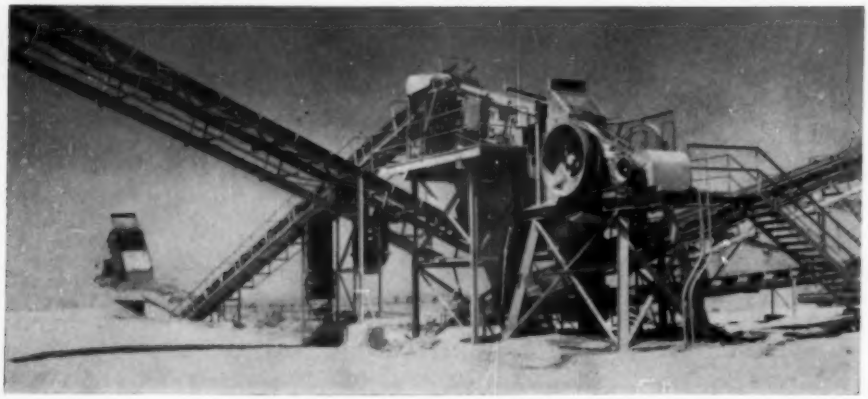




ONE SECTION of the plant is controlled by switches placed near one truck-loading gate



NATURAL SAND removed from the flow of aggregates just ahead of the primary crusher is stockpiled ready for shipment



ALL EQUIPMENT at Kern Rock is mounted above ground, including the primary crusher that takes oversize from primary screen

STEP UP SHIPPING EFFICIENCY . . .

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The top deck is split into thirds to help equalize the load on succeeding decks. The section nearest the feed end has 1½-in. openings, the middle has 2-in. openings, and the final third has 3-in. openings. The plus 3-in. goes directly to the primary crusher, a 36 x 44-in. jaw-type unit.

The second deck also is split into thirds. The two end sections have 1-in. openings, while the middle section has 1½-in. openings. The middle section is changed to 1 in. when it is necessary to produce a greater percentage of crushed materials. Oversize from this deck is conveyed to a 4¼-ft. standard cone crusher.

Usually the throughs are conveyed directly to the main screening tower. However, the pit runs pretty heavy to sand, and at times it is necessary to waste sand to provide enough gravel to meet demands for crushed material. This is the function of the third deck. It has a punched plate with ¼ x ¾-in. openings. A splitter gate allows any percentage of the throughs to be carried off to storage while the rest drop onto the belt with the ¼ x 1½-in. material for the trip to the main screening tower. This arrangement also reduces belt wear since the fines cushion the belt against the impact of over-size material.

Waste is a misnomer for the unwashed sand removed at this point. Kern Rock sells all it can produce, both for use in hot mix and on oil-topped roads. The County Highway Dept. considers unwashed sand a superior product.

Crushed material from the primary is conveyed directly to the secondary crusher. Since pit run tends to be about two-thirds minus 1½ in., there is very little chance of overloading the standard cone crusher. The minus 2-in. material from the secondary is conveyed directly to the main screening tower. This belt is parallel to the belt carrying minus 1½ in. natural material. A wide walkway has been constructed between the two conveyors, which provides a large work area making maintenance simpler and safer.

The 100-percent crushed material passes over a 4 x 12-ft. single-deck screen. Oversize from the top deck, usually 1¼ in. (although this screen is frequently changed to ¾ in.), is chuted directly to a 350-ton steel bin. Oversize is drawn from the bin to a shorthead cone crusher for recrushing and is then returned to the screen. The storage bin provides a steady feed to the tertiary crusher, allowing it to operate always at optimum efficiency and capacity.

The 1¼-in. dust material passing through the screen is conveyed to two double-deck screens mounted over five steel storage bins. Oversize from both decks of the first screen is chuted directly to the bins below. The throughs (¾-in. x dust) drop onto a short length of conveyor and are sent to a second double-deck screen. This screen separates three more products: ½ in., ⅜ in. and dust.

The minus 1½-in. natural aggregates are split when they reach the screening tower. Both pass over 4 x 12-ft. double-deck wash screens. Plus ⅜-in material from the top deck is conveyed to two more double-deck screens mounted above the five steel storage bins allocated for washed rock. The first, a 4 x 12-ft. unit, makes two sizes: 1 and 1½-inch.

Throughs drop onto a conveyor stub and are carried to a 3 x 12-ft. double-deck screen that separates the three remaining sizes: ½, ⅜, and ¼ x $\frac{3}{16}$-in. The last size (locally called birdseye) is actually a carryover product from the sand. It is in great demand for well rock.

Sand from the two wash screens in the main screening tower drop through split chutes to two spiral classifiers mounted directly below. A 60-in. units is used for concrete sand, and a 36-in. classifier produces mason sand. Both can be operated in tandem or, if desired, all feed can be shunted to the unit producing concrete sand. The split chutes allow exact control of the percentage of feed reaching each unit.

Concrete sand is conveyed to a swing conveyor mounted on top of the gravel storage bins. Mounting it this way allows the creation of a large stockpile without a long conveyor or a steep incline. Mason sand is conveyed directly from the classifier to ground storage. END

MAJOR EQUIPMENT REFERENCE

Shovel, 2½-cu. yd.	Link-Belt Speeder Corp.
Quarry haul trucks, 20-ton (2)	Mack Trucks, Inc.
17-ton (1)	Dart Truck Co.
Jaw crusher, 36 x 44-in.	Farrel-Bacon Co.
Cone crushers:	
4¼-ft. standard	Nordberg Mfg. Co.
4-ft. shorthead	Nordberg Mfg. Co.
Crusher motors, 150-hp. (3)	General Electric Co.
Vibrating screens:	
4 x 12-ft., 1-deck (1)	Nordberg Mfg. Co.
4 x 12-ft., 2-deck (4)	Nordberg Mfg. Co.
3 x 12-ft., 2-deck (2)	Nordberg Mfg. Co.
Vibrating screens:	
5 x 12-ft., 3-deck	Stephens-Adamson Mfg. Co.
4 x 12-ft., single-deck	Stephens-Adamson Mfg. Co.
Spiral classifiers:	
60-in.	WEMCO Div., Western Machinery Co.
36-in.	WEMCO Div., Western Machinery Co.
Conveyor idlers	Stephens-Adamson Mfg. Co.
Front-end loaders:	
3-cu. yd.	Frank G. Hough Co.
2-cu. yd.	Clark Equipment Co.

Arkansas producer realizes savings as he generates electric power with a high-compression natural gas engine

Natural gas powers crushed stone plant

CLARK C. MCCLINTON is an Arkansas businessman who knows it pays to shake hands with opportunity when it knocks. The last time he did, he found in his palm a tidy sum . . . more than $2,000. It represents fuel savings in just one year from a switch to natural gas from diesel engines at his crushed limestone plant.

The McClinton Bros. plant, of which Clark McClinton is president, produces 150 tph. of dry, white limestone meeting exact specifications. Of his new centralized power plant, Mr. McClinton says, "I feel it will pay for itself in fuel savings alone in this installation before we have any mechanical expense of note."

Despite the fact that natural-gas power plants are scarce as hen's teeth in the rock products industry, Mr. McClinton sensed the savings his company could realize. His quarry is at Johnson, Ark., near Fayetteville, a region where this form of power is plentiful and cheap. Checking it out, he found he could save 75 percent in fuel costs with a high-compression, natural-gas engine over a diesel engine.

Clark McClinton did consider diesels when he decided to modernize plant facilities and centralize its power, but comparison of operating costs caused him to abandon the idea. In converting to natural gas, he replaced several diesels which had served him well for 14 years.

After discussing the availability of low-cost natural gas with his local municipal supplier, Arkansas Western Gas Co., Mr. McClinton soon installed a natural-gas electric set which produces 175 continuous kw. of prime power. What is it called on to do? From its remote installation, it powers the jaw and roll crushers, three multi-deck screens, six conveyors, two screen heating units and a 300-amp. electric welder.

MOST of McClinton Bros.' equipment is tucked away under a cliff and is practically invisible from the mine opening above

Here, in black and white, are figures comparing operating costs of the new power station with a diesel generator set of equal size:

Diesel generator set 175 kw.
14.5 gph. @ 11¢
(cost per gal. diesel fuel Fayetteville area)
Fuel cost per hr. $1.595

Natural-gas electric set 175 kw.
2,000 cu. ft. per hr. @ 25¢ per 1,000 cu. ft.
(cost natural gas Fayetteville area)
Fuel cost per hr. .50
Fuel savings per hr. gas over diesel $1.095
2,000 hr. (8 hr. day, 5-day-wk., allowing 2 wks. shut-down time for bad weather, etc.) @ $1.095
Estimated fuel savings per yr. McClinton operation $2,190

The McClinton quarry operation is unusual in a respect other than its power source: Top-grade limestone is recovered by punch mining into the vein from the side of a mountain. Low mountains rich in limestone deposits ring around a valley on three sides. In this valley are located the quarry office, asphalt mixing plant and rock crushing and screening facilities.

Limestone veins are located by core drilling from the mountain tops, then, the rock is recovered by punch mining horizontally into the vein. Using the room and pillar method, the crews air drill and blast to loosen the stone. Chunks of pure limestone are picked up by rubber-tired tractor loaders and hauled to the crusher by diesel trucks.

The McClintons—Clark, the president, and his son David—capitalize on their elevation and save more on power by gravity flow of material into the plant. The crusher installation nestles against the side of a large hill. Trucks dump their loads

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NATURAL GAS POWERS PLANT

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SHIPPING EFFICIENCY from the McClinton plant is maintained with a 4-compartment steel bin under a big vibrating screen

onto a conveyor at the top. The rock passes through the two jaw crushers, a roll crusher and onto sizing decks of the plant's three screens.

Sized material is stored in a 250-ton, four-compartment steel bin. Trucks pull up under this bin to load the finished product. Customers include government buyers, highway and road construction contractors, building contractors, farmers and private individuals.

There is still more to this story than has yet been told. As veins run out deep in the mountain, tunneling operations are begun at a new site. The abandoned tunnels provide natural storage areas for many products—the atmosphere is cool and dry during summer and winter and free from freezing.

Clark McClinton plans to lease storage space as it becomes available. Surplus stocks of milk cans stored here will not rust as they would if stored in an ordinary building above ground. The potential value of underground storage such as this has been illustrated in Missouri where the government has stored a complete hospital along with reserve blood plasma, ready for emergency use in atomic attack. **END**

POWER is supplied by 175-kw. gas-electric generator. The equipment is protected from weather by a concrete block building

MAJOR EQUIPMENT REFERENCE

Primary jaw crusher, 24 x 36-in.	Universal Engineering Div.
Third stage roll, 40 x 22-in.	Universal Engineering Div.
Secondary jaw crusher, 10 x 36-in.	Iowa Mfg. Co.
Vibrating screen, 4 x 12-ft. dd.	Iowa Mfg. Co.
Vibrating screens (2) 4 x 12-ft., 3 x 10-ft.	Simplicity Engr. Co.
Shipping bin, 4-comp.	Fort Smith Structural Steel Co.
Natural gas-electric generator set, 175-kw.	Caterpillar Tractor Co.

RIGHT: The crushing, screening and conveyor circuits are all powered with current generated by a natural gas engine

Timken Roller Bearing's steel containers protect lime, shield workers from hazards

Quicklime now comes in boxes

THE SLOGAN "untouched by human hands" made a product famous. A new materials handling system featuring steel boxes that haul and store pebble lime brings this slogan to a steel mill. It was developed to insure production of quality steel, but extends protection to humans, too. By restricting their contact with lime, it reduces the hazards which often have accompanied lime handling by the user.

Timken Roller Bearing Co. is responsible for the innovation, which it developed in conjunction with a steel fabricator. The steel maker is gratified with the way the lime-handling system meets its objective: to improve melt shop practices. Pebble lime is safeguarded from moisture in the air from the time it leaves Marble Cliff Quarries in Columbus, Ohio, until it is emptied into charging boxes on the melt shop floor of the Timken Co.'s Steel & Tube Div. in Canton. One box fills three charging boxes for the electric furnaces.

After a year's trial, the Timken Co. is realizing many advantages from use of the new method. And it has won recognition in the form of the Material Handling Award sponsored by the Cleveland chapter of American Material Handling Society. It offers benefits from the point of view of both lime producers and their customers.

Are the steel boxes a Timken Co. exclusive? Answers a company spokesman: "To the best of our knowledge, these containers are not used by any other manufacturer. However, several companies have sent inquiries concerning them. They are not

Please turn page

TEN CONTAINERS are filled on truck bed at Marble Cliff

QUICKLIME IN BOXES

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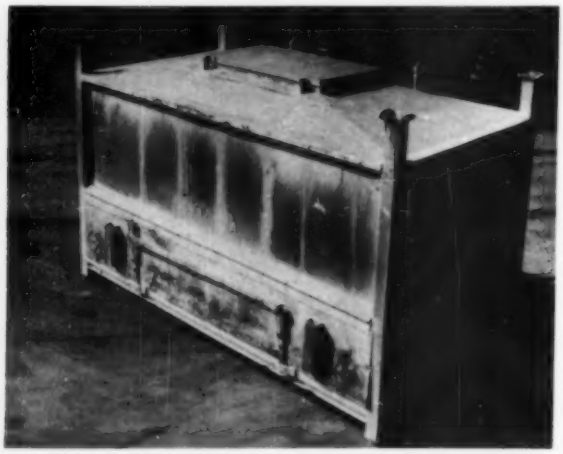
available commercially but must be custom built."

The metal containers are 38 in. high, 40 in. wide and 80 in. long. They were carefully designed to hold enough lime to fit three charging boxes and to fit on the flat bed of a truck 10 at a time. A trap door at the bottom of each container releases the lime. Four flared pedestals at the top are 6 in. long and permit them to be stacked one on top of the other. And there are pins at the top that are used to dump the containers.



THIS IS ONE of the metal containers—feature items of the lime-handling system

THE CONTAINERS stack easily and safely

The system calls for 10 of these containers to be filled in place on the truck bed. Each truck load is about 34,000 lb.—about one-third of the daily requirement of the melt shop when running at full capacity. Two trucks haul lime as needed . . . inventory is kept low to insure a fresh supply of active pebble lime.

Lift trucks unload the containers from the trucks and stack them in the storage area. The company has two lift trucks for this purpose, which also take lime to the charge floor of the melt shop on a first-in, first-out basis.

Normally, the lime will be used within three days after arrival assuring the melt shop a fresh, uniform quality of lime. In the storage area, the containers are stacked in bays by truck lots so that shipments will be used in the order they are received.

From the storage area, located directly beenath the charging floor of the melt shop, the lime is taken to the floor by lift truck ramps. It can be obtained when ordered by the melters, literally within minutes. Usually an 8-hr. supply is kept on hand in the charging boxes; it is limited to this amount to conserve space on the melting floor.

To empty the containers, the lift trucks use an adapter. A container is suspended over three

LIFT TRUCK OPERATOR unloads containers from the truck

charging boxes and a release to the trap door is tripped. Empty containers then are returned to the storage area.

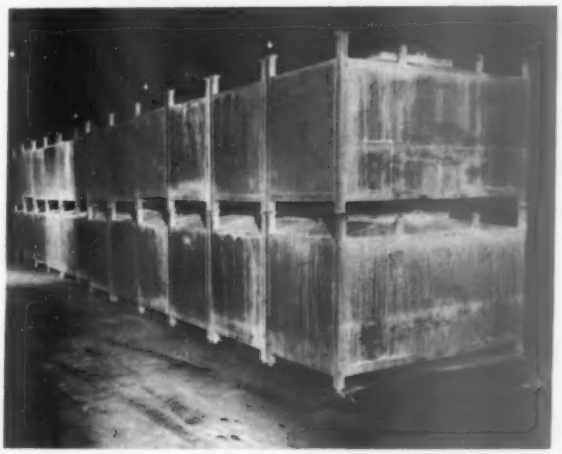
Inventory control is very simple. Empty containers are loaded on a truck to be taken to Marble Cliff Quarries for refilling. Lime requirements can be regulated to any level of melting operations.

How many containers are needed to supply the needs of the Timken Co. melt shop? Only 120. Delivery by truck has never been interrupted for more than a day, even during the severe winter weather experienced in Ohio last year. The company uses its own trucks to transport the lime.

To discover how streamlined the operation is, compare it with the former practice when lime was bought in carload lots. Then it either was dumped directly into charging boxes or piled into shallow containers on the charging floor. An emergency supply was stored in a large bin. Often lime arrived in several cars at a time, thereby compounding the problem. Besides being cumbersome and space-consuming, this open-storage method permitted the lime to absorb moisture and begin to air-slake.

"Our primary concern in trying the new system was to improve the quality of the steel we produce," states Harry Walther, superintendent of the Timken Co.'s melt shop. "After a year's trial, we can say that the metallurgical results are more than we hoped for. In addition, the material handling benefits are outstanding. Today, there is practically no physical handling, such as shoveling, of lime. What's more, lime dust from extra handling is virtually eliminated." His comment underscores the system's dual protective advantages.

Lime boxes are made by W. B. McCelland Co., Cleveland, Ohio. END



IT TAKES 120 containers to fill needs of melt shop

LIME is taken to the charging floor by lift truck

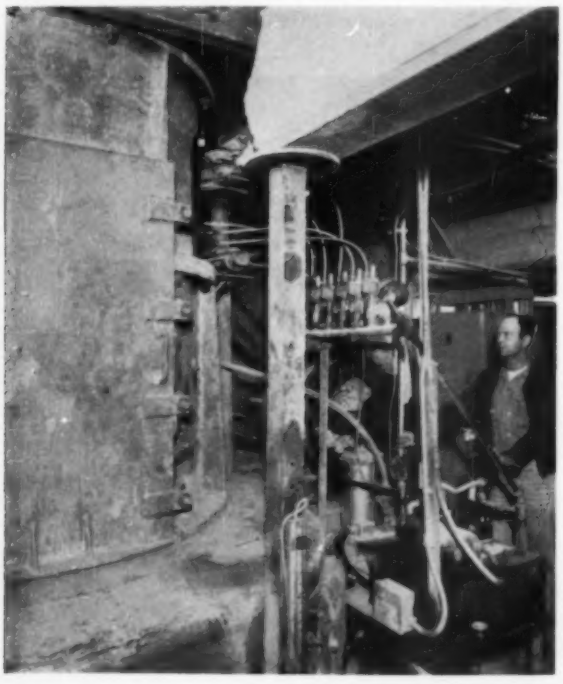
USING AN ADAPTER, the lift truck suspends the container over three charging boxes

Liberty Stone reduces power 30 percent when grinding soft, tough material to micron sizes

SOAPSTONE YIELDS TO PNEUMATIC MILL

by Kneeland A. Godfrey, Jr.

THE PNEUMATIC MILL at the left takes up most of the room in the mill area. An operator checks the automatic lubrication system that keeps mill maintenance low



HERE'S A SWITCH on the usual crushing problem—stone so soft and spongy that it demands extra power for pulverization. Relatively kind to wearing parts, this low-silica stone exacts its toll in high power costs—that is, it did until a producer tackled the problem squarely by substituting a pneumatic grinding mill for a ball mill. The producer: Liberty Stone Co., Sykesville, Md.; the product: soapstone. The difference in power cost with new equipment: down an impressive 30 percent.

Other rock product producers who grind nonabrasive stone to extremely fine micron sizes may tear a page from owner Thomas Wright's book. Claiming to be the first in the soapstone industry in the United States to turn to pneumatic grinding, Mr. Wright can speak with authority on the benefits of the method which he has been using nearly four years.

The pneumatic mill has two features which boost its performance. One is an air separator in the mill circuit that takes out material fine enough to meet specifications of 100, 200 or 325 mesh. All horsepower is used crushing oversize, not stone that already is fine enough. The second feature is a 1½-million Btu. per hr. dryer that is included as part of the mill circuit. Feed material is reduced from 12 to 15 percent moisture to less than ½ of 1 percent. It takes less power to pulverize dry stone than wet stone, according to Tom Wright.

Driven by a 75-hp. electric motor, the mill turns out 3 to 4 tph. when grinding up to 97 percent minus-325 mesh, and at 9 to 10 tph. when making a 65 to 75 percent minus-200 mesh product. The air conveying system uses a 60-horsepower motor on the fan.

Minus 1-in. feed is prepared by a new portable crushing setup at the quarry, nearly 4 miles away, and is trucked to Sykesville. Raw rock is elevated to a 400-ton storage bin. From here it is fed to the mill with a vibrating feeder.

To orient those readers who are unfamiliar with this particular segment of the rock products industry, Liberty Stone is one of 400 producers in the U. S. who together turn out 500,000 tons of soapstone a year. According to Industrial Minerals & Rocks, this country led the world (26 percent) in talc and soapstone production in 1958, the last year for which figures were available. Admittedly only a small part of the gigantic nonmetallic minerals industry, it is a thriving and specialized one.

Tom Wright reports high demand for his prod-

uct from asphalt-roofing plants which use it as a filler. He says that in just a few years of selling to this market, he has achieved about 40 percent of the volume. Sales to roofing plants accounted for about 25 percent of Liberty Stone's sales last year, or about 4,500 tons.

Other major markets: (1) Asphalt filler used in making "pipeline enamel" for coating pipeline. This accounts for 30 percent of sales. Mr. Wright notes that about a fourth of the material in pipeline enamel is pulverized soapstone.

(2) Soapstone used as filler in synthetic rubber and for dusting tire molds accounts for 12 percent of sales and (3) soapstone used as "carrier" in powdered insecticides takes 10 percent.

The pneumatic mill is in closed circuit with two other units: a 60-hp. fan which cycles the powdered soapstone and hot, dry air, and the air separator. This separator replaces a vibrating screen traditionally used for the purpose. Equipped with a fineness selector, the air separator has proved to have far greater flexibility than the earlier screens. Fineness and moisture tests are run once an hour to provide a constant check of production quality.

Drying is done by introducing 170-deg. F. air, into the circuit. Since the soapstone is ground very fine, any leakage in the circuit could be a problem. But a neat answer has been found: Pressure in the closed loop is maintained at less than atmospheric pressure, insuring that any leakage will be into the system, not out.

Equipment is arranged as shown in the drawings. The mill itself sits on footings on the basement floor of the plant, and extends up above first-floor level. The dust collector, and the air separator with four finished-product bins beneath, are placed high overhead in upper stories of the plant.

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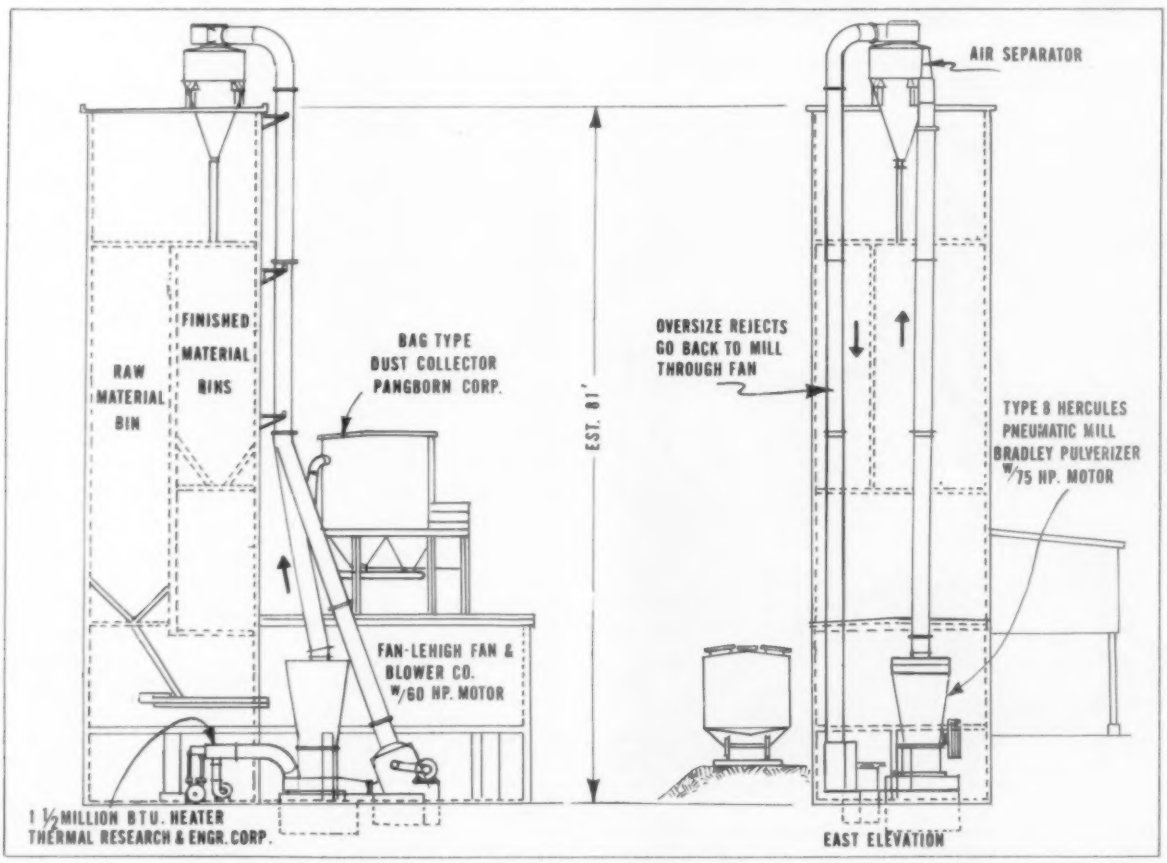
AIR SEPARATOR
FINISHED MATERIAL BINS
RAW MATERIAL BIN
BAG TYPE DUST COLLECTOR PANGBORN CORP.
OVERSIZE REJECTS GO BACK TO MILL THROUGH FAN
EST. 81'
TYPE 8 HERCULES PNEUMATIC MILL BRADLEY PULVERIZER W/75 HP. MOTOR
FAN-LEHIGH FAN & BLOWER CO. W/60 HP. MOTOR
1 ½ MILLION BTU. HEATER THERMAL RESEARCH & ENGR. CORP.
EAST ELEVATION

SOAPSTONE YIELDS . . .

continued from page 97

ONE MAN at a panel can control the operation of the entire system, including fans, mill and furnace

LIBERTY STONE CO.'s new soapstone installation at Sykesville, Md., is in an old grain storage elevator

With this setup, gravity flow of product into covered gondolas or trucks is possible.

Strategically located beside a Baltimore & Ohio spur, the plant ships by rail and truck, in both bulk and bag. Most tonnage goes by covered, hopper-bottom gondolas, with 21 assigned to the firm. Truck delivery is handled by the company's two semitrailers which cover a nine-state area in the Middle Atlantic and east North Central states. All together, deliveries go to a 21-state area.

Production at Sykesville is supplemented by that of Liberty Stone's original plant at Marriotsville, about 4 miles away. This plant still uses the traditional ball mill, but Tom Wright hopes to replace it soon with a pneumatic model.

Soapstone is quarried from a stratum outcropping from a steep, deep river valley in the hilly Marriotsville area. More than 6 million tons of reserves are located in the old quarry which has been worked since Civil War days. On the basis of 1959 sales of about 18,000 tons, the reserves are adequate for more than 300 years!

Liberty Stone's portable crushing operation was started up just last year. It replaced a stationary plant that had become inadequate. Here, stone is crushed to minus 1 in., then trucks take it to the Marriotsville plant nearby, or over the four miles to Sykesville.

The portable plant has almost no jaw wear problem, but the soft stone doesn't always break up on the first pass. Two engines power the operation. Other equipment at the quarry includes a ¾-cu. yd. crawler shovel, 1536 jaw crusher, 1216 hammermill for recrushing and four rear-dump trucks for quarry and interplant hauls.

Liberty Stone also mills magnesia-type clay taken from two mines in the area. Ground to 90 percent minus-325 mesh, the clay is used in making ceramic clay and plastic tile. About 20 percent of sales are derived from this product. **END**

MAJOR EQUIPMENT REFERENCE

IN MILL:

Pneumatic grinding mill, Hercules BP-8	Bradley Pulverizer Co.
Cyclone-type fines separator	Bradley Pulverizer Co.
Dust collector, bag-type, 5,000 cfm	Pangborn Corp.
Heater, 1.5 million Btu.	Thermal Research & Engr. Corp.
Fan at mill	Lehigh Fan & Blower Co.
Vibrating feeder	Syntron Co.
Automatic lubricating system	Bowser, Inc.
Mill overheating control	Minnesota Mining & Mfg. Co.

AT QUARRY:

Crawler shovel, ¾-cu. yd.	Thew Shovel Co.
Jaw crusher, 1536	Diamond Iron Works, Inc.
Hammermill, 1216	Gruendler Crusher & Pulverizer Co.

Its numerous compounds have a powerful influence on the properties of portland cement

Let's scrutinize silica

by Donald L. Derrom†

FOR A LITTLE WHILE, let's ignore "portland cement" and concentrate on the extraordinary versatility of those chemical compounds called calcium silicates. They get many of their unique properties from the role of silicon in the form of its oxide—silica. "Portland cement" might better have been called "silica cement," for silica, in its various forms, is the prime factor in cement manufacture. It affects the chemical and other phases of the process, as well as the ultimate use of the product.

The major peculiarity of cement is that the raw materials used in its manufacture and control of set are all as found in nature and, therefore, may vary widely. If we were to look inside the firing zone of a rotary kiln, we would find the main compounds listed with their formation temperature relationships as in Table I.

The definition of the limits for any of these compounds has been established by the American Society for Testing Materials and stated in these terms: "Portland cement is the product obtained by pulverizing clinker consisting essentially of hydraulic calcium silicates to which no additions have been made subsequent to calcination, other than water and/or untreated calcium sulphate, except that additions, not to exceed 1.0 percent of other materials, may be interground with the clinker at the option of the manufacturer, provided such materials, in the amounts indicated, have been shown not to be harmful by tests carried out or reviewed by Committee Cl on Cement ASTM."

Within these limits, an unlimited number of quite "legal" and good cements may be made. Any one cement plant may make a wide band of cements if widely varying materials are available. That control by such a flexible rule is possible, is due to the versatility of silica in general, and the calcium silicates in particular.

This adaptability of the silicates, or capacity to perform over a very wide band of hydraulic cements, is a major asset to the industry. However,

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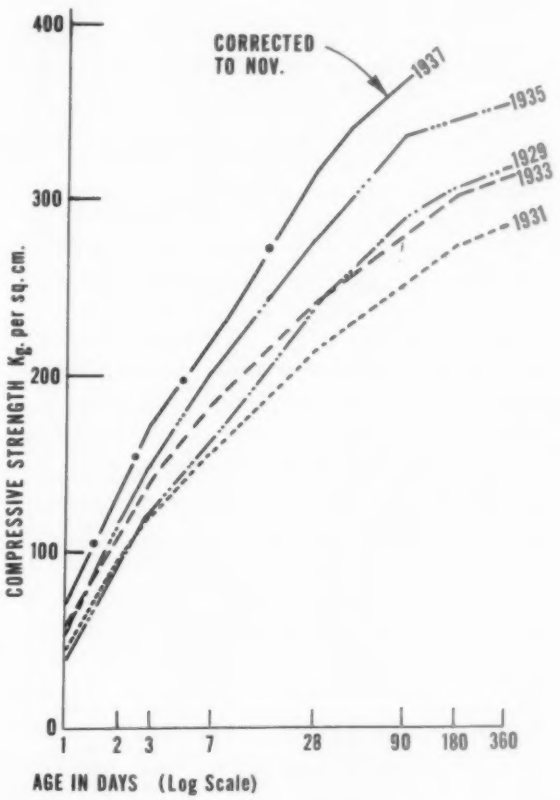


GRAPH I—How quality of our cement improved, based on tests of cylinders. These were made using a ratio of 1:5 graded sand

†Engineer, 1701 Sixteenth St., N.W., Washington 9, D.C.

*See, also, Part 1 of Safaris in Cement, *Constant-speed kilns pay off*, October 1960 ROCK PRODUCTS, page 103

LET'S SCRUTINIZE SILICA

continued from page 99

it does not pay a producer to bask under the broad parasol of liberal definition. To do so is to court low quality, low production and elevated costs. For the sake of cement uniformity and economic reasons, a much better practice is to set the ranges, tighten tolerances and narrow the variation of any cement.

A flowing stream like clinker production, having a critical bottleneck in the firing zone, requires stability of feed and constant checking of all items. This extends to every material, item, operation and action throughout the entire process.

TABLE I—The ranges of temperatures at which the principal cement-making ingredients are formed. Note that calcium is involved in all, and silica in three reactions. (from Jaspers)

No.	Symbol	Centigrade		Fahrenheit	
		T_1C	T_2C	T_1F	T_2F
1	CA	?	800	?	1,472
2	CS	800	900	1,472	1,652
3	C_3A_3	900	950	1,652	1,742
4	C_2S	950	1,200	1,742	2,192
5	C_3AC_4AF	1,200	1,300	2,192	2,372
6	C_3S	1,300	1,400	2,372	2,552

TABLE II—Temperature analysis of silica-bearing components in portland cement (from Jaspers)

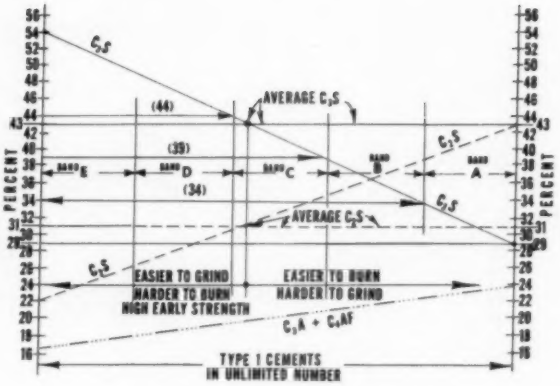
No.	Symbol	Range in Deg. F. Low	High	Difference in deg. F.		
2	CS	1,472	1,652	180	630	1,160
4	C_2S	1,742	2,192	450		
6	C_3S	2,372	2,552	180	530	

TABLE III—Typical analysis of 11 samples of Type 1 portland cement (from *Concrete*, by Troxell & Davis, and from *Concrete Manual*, U. S. Bureau of Reclamation, 6th edition)

	C_3S	C_2S	C_3A	C_4AF	$CaSO_4$	Free CaO	MgO	Ignit.	No. Avgd.
Max.	54	43	14	10	3.3	1.5	3.8	2.3	11
Min.	29	22	9	6	2.2	.0	0.7	0.6	
Average	43	31	12	8	2.8	0.8	2.4	1.2	

TABLE IV—Ratios of constituent compounds based on range of C_3S in samples of Type 1 portland cement

C_3S Range (percent)	C_2S	$\frac{C_3S}{C_2S}$	$\frac{C_3A}{C_4AF}$	$\frac{C_3S+C_2S}{C_3A+C_4AF}$	Remaining Elements	Grand Total	Band
49 to 54	22.0	76.0	16.8	92.8	10.9	103.7	E
44 to 49	26.2	75.2	18.6	93.8	9.0	102.8	D
39 to 44	30.4	74.4	20.4	94.8	7.2	102.0	C
34 to 39	34.6	73.6	22.2	95.8	5.3	101.1	B
29 to 34	38.8	72.8	24.0	90.8	3.5	100.3	A



GRAPH II—This calibration chart has been divided into five bands to help in the selection of the composition of cements

The prepared mix, entering the firing zone, is nothing of particular value. But after passing through the firing zone and coming out cooled, it is portland cement, lacking only finish grinding. That is why it is advisable to take the utmost care in all the operations preceding the firing zone. This we term general calibration.

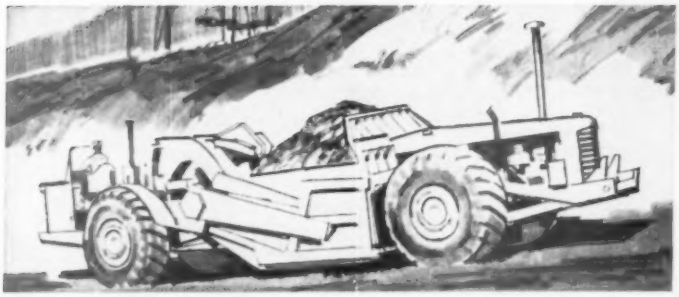
In my own experience, we invented a calibration method by which we could carefully plot our limestone and clay raw materials. Ours were probably the world's worst, geologically, physically, chemically and with respect to uniformity. Physically folded, bent, twisted, faulted, hard to strip and poisoned with heavy magnesia in stretches, their variability was our salvation. Actually, there is more trouble in a quarry of more uniform deposits whose properties resist readjustment.

We employed a brilliant, practical geologist to calibrate the quarries in cooperation with the chemist and quarry superintendent. He also was appointed quarry and materials inspector with full powers to institute change in procedure. His inspections were made once a week or upon call during emergencies.

Graph 1 tells the story of our success with this calibration method. It gives the yearly averages, and shows that quality started to rise the first month and that production rose with it. Improvement was slow but steady. The cost of quarry operation declined, fuel consumption became radically better, dust losses declined, and the whole operation took on a happier aspect. If we had practiced constant speed, which I wrote about in my last "Safari," things would have been better still.

Please turn to page 118

ALLISON
smooths out starts
TORQMATICALLY



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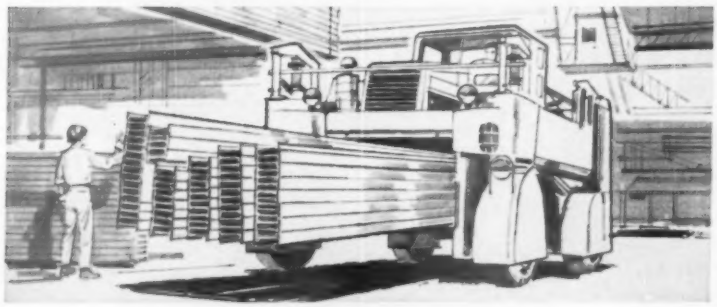

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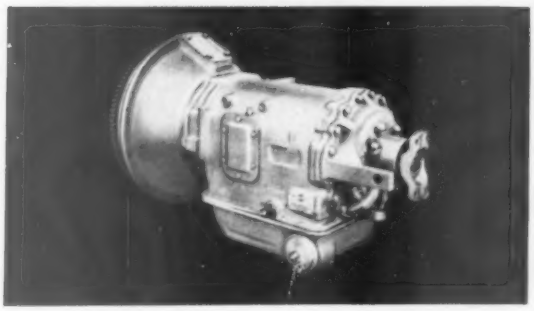
"Easy Does It" for 30-Ton Loads—Equipped with an Allison CT-3340 TORQMATIC DRIVE, this Gerlinger Material Handler starts 20- and 30-ton loads slick as a whistle for an Eastern steel producer. Unit works 24 hours a day, five days a week, has cut steel handling costs 50%.



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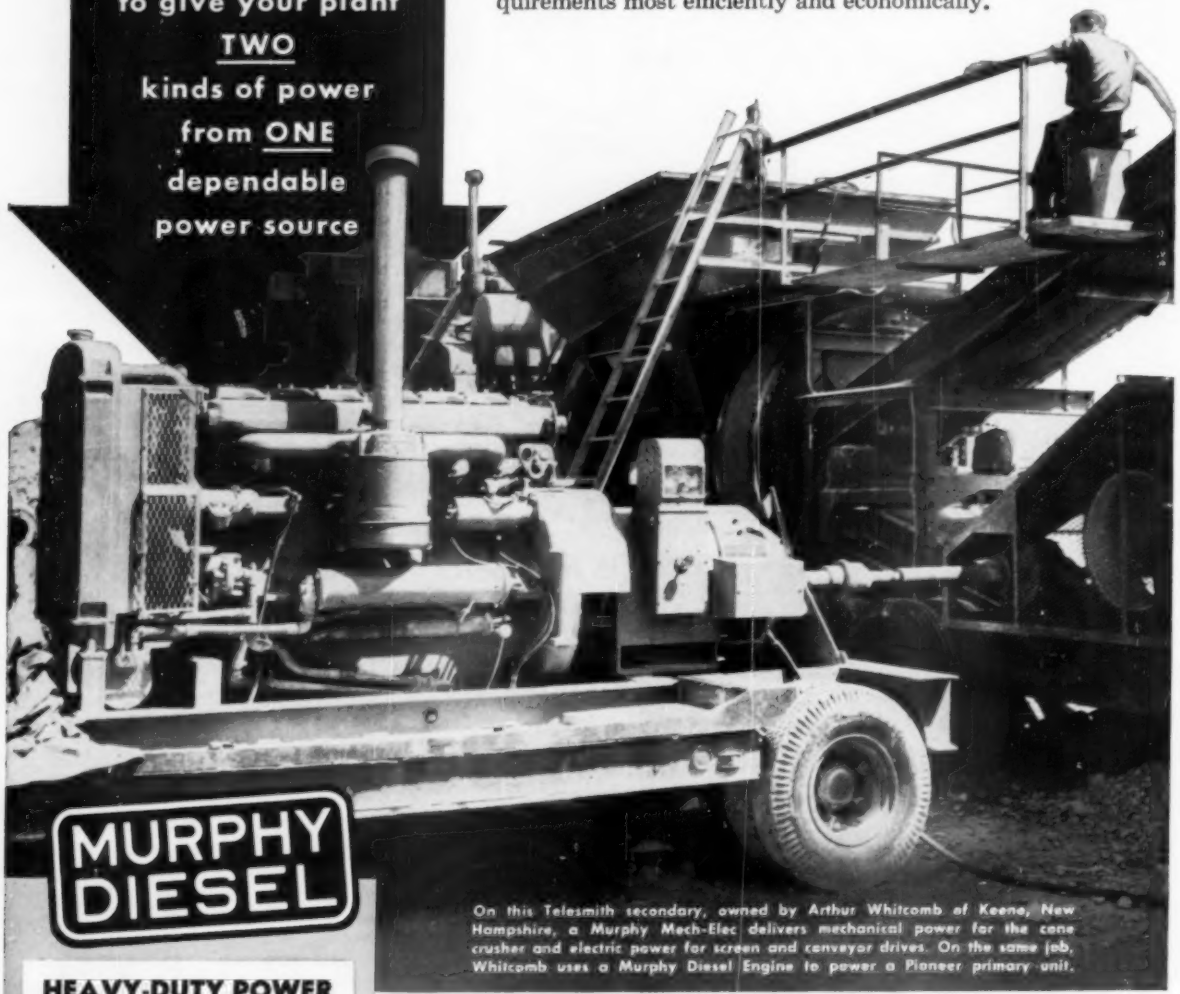

On this Telesmith secondary, owned by Arthur Whitcomb of Keene, New Hampshire, a Murphy Mech-Elec delivers mechanical power for the cone crusher and electric power for screen and conveyor drives. On the same job, Whitcomb uses a Murphy Diesel Engine to power a Pioneer primary unit.

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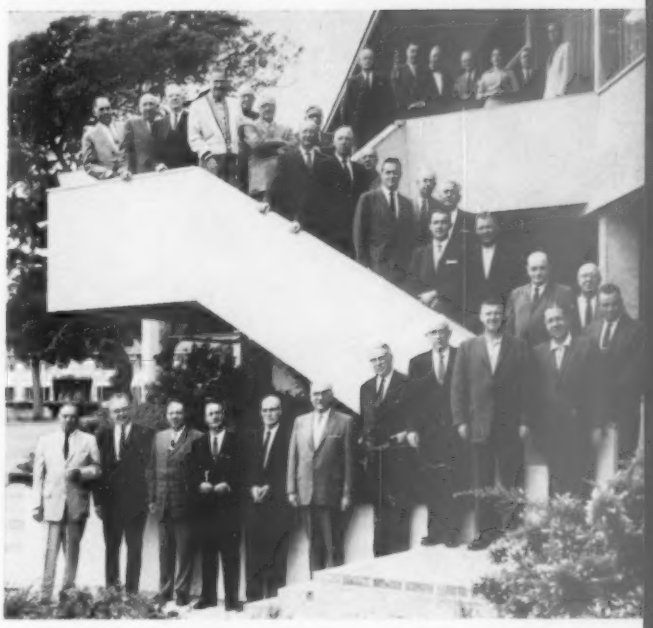
Depletion, depreciation, freight rates, acquisition of public lands–these and other industry problems got full analysis at the National Sand & Gravel Assoc.'s board meeting in California

NSGA Board reviews status under federal actions



NSGA BOARD and staff convene after a session for a group photo

NSGA EXECUTIVE COMMITTEE—Front row (left to right): E. K. Davison, president; Fred P. Curtis, vice president; C. G. Cooley, A. H. Smith, and Joseph L. Shielly, Jr. Rear: Charles E. Brady, and Harold E. Bender, secretary-treasurer

ACTION BY THE FEDERAL GOVERNMENT on tax matters so far this year has clarified some of the sand and gravel industry's problems. At the same time, that action has left unanswered other problems and may have created some new ones.

Specifically, the Supreme Court's decision on the Cannelton Sewer Pipe Co. case was vague enough to cause uncertainty in the industry as to how the criteria on percentage depletion set up by the Court may be applied in the future. Nearly the same may be said for the Public Debt & Tax Rate Extension Act of 1960. Uncertainty will exist until it is more clear how the Treasury Department interprets these federal actions.

The situation on depreciation is a little more clear, except that Congress took no action on the question this year. But the Supreme Court did. In three recent cases, the Court held that the important thing with regard to salvage value and useful life is the taxpayer's experience in his own business. Apparently, in this area, both the federal government and business wish to work out problems between them in an attempt to supplement rather than to deter the economy.

Another request for increased freight rates hit the industry this September when all Class 1 railroads filed a petition with the Interstate Commerce Commission, docketed as Ex Parte No. 223. Railroads asked for an increase of 10¢ per net ton on sand and gravel up to $13 per ton, and 20¢ per net ton on rates higher than $13. They also asked for an increase in switching charges per car, and for a jump in charges for weighing and reweighing the cars.

Since the NSGA Board meeting, the ICC has handed down its decision in Ex Parte No. 223, which said that the proposed increase of 10¢ per net ton on sand and gravel and other materials should not be suspended nor investigated. It rec-

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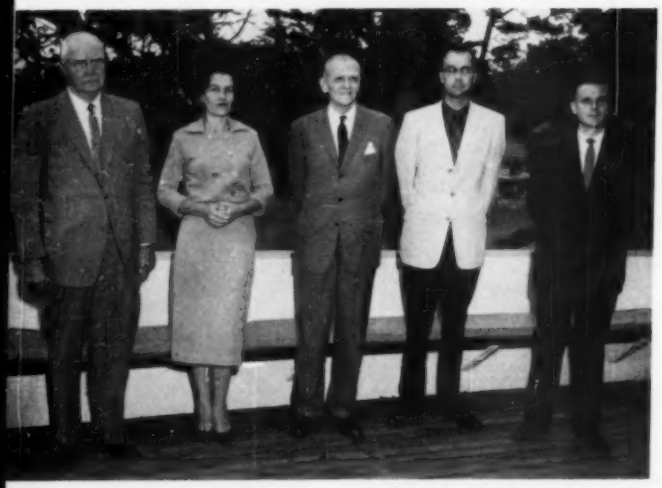
NSGA BOARD MEETING

continued from page 103



NSGA HEADQUARTERS' STAFF—Left to right: Stanton Walker; Mrs. Nan T. Cavey; Vincent P. Ahearn, managing director; Delmar L. Bloem, and Kenneth Tobin, Jr., associate managing director

ommended that the proposal to increase minimum per-car charges should be investigated and suspended during the investigation, that special charges should become effective, that increases in switching charges should be investigated but not suspended, and that the car detention or rental charge was suspended pending investigation.

Another serious problem to sand and gravel operators is operation under Public Law 167. Regulations under that law have tended to limit ability of western operators to obtain reserves for future operation. The law deals with the location, purchase and lease of sand and gravel deposits on public lands. Specifically, sand and gravel are excluded from the Materials Act since they have been termed "common varieties," which are not deemed valuable mineral deposits within the meaning of the mining laws of the U. S.

These, and many other important problems, were highlighted at the regular Fall meeting of the NSGA Board of Directors Meeting which was held this year at Del Monte Lodge, Pebble Beach, Calif., October 3-5. It was held in conjunction with the Board of Directors' meeting of the National Ready Mixed Concrete Association. A joint meeting of both Boards took place on October 5. President of NSGA, E. K. Davison, presided at the entire Board meeting, and also at the Joint Board meeting of both Associations.

Taxes got a complete analysis by the Board, led by Robert Mitchell, chairman of the Tax Committee, and Vincent P. Ahearn, NSGA managing director. General subjects of percentage depletion, depreciation, proposed regulations on aggregation of mineral properties and expense accounts were discussed in a release prepared by John T. Sapienza and Richard A. Brady, Association tax counsel. Copies of that release have since been mailed to all Association members.

New regulations on the aggregation of mineral properties for tax purposes were issued by the Treasury Department in August of this year. Opinion of tax counsel is that the subject probably won't be the cause for much worry by sand and gravel people, since effects of regulations on them will be limited. But counsel for the Association did review the proposed Treasury regulations and submitted comments and suggestions. The new regulations, it turned out, were in line with provisions of the statute, so counsel advised against appearance by the Association at the hearings on September 21.

Expense accounts have been given much attention by the Internal Revenue Service and Congress this year. Congress, particularly, wanted to get tough with deductions for entertainment, gifts, club dues, etc., and a bill limiting such allowances passed the Senate. It didn't get by the House-Senate conference, though, which called for a study by the Joint Committee of Internal Revenue Taxation and the Treasury Department. A report is expected to be available for the next Congress.

You can count on expense accounts being a target of Congress and the Treasury for the next few years. The Commissioner of IRS has told all revenue agents to take a good look at deductions coming under this heading; at the same time, he's asked them to be reasonable.

The practical operation of Public Law 167, as explained by James R. Henderson, is to limit the mining of sand and gravel from public lands. A recent meeting with important Congressmen indicated that it would be necessary to get further legislation to define "common varieties" of sand and gravel as construction aggregates, to relieve the discrimination against those materials. It also was indicated that such legislation would be hard to get. The Board was asked to lend assistance to western operators to get sand and gravel out of the category of "common varieties" of minerals, so difficulties in procuring reserves for future mining could be overcome. The Board agreed to lend that assistance.

An engineering discussion led by Stanton Walk-

er, pointed up the fact that continued research and study will open up better markets for producers' products. There appears to be a good market for granular-base materials in highway and airport runway construction. However, these markets carry special specifications. It was reported that specifications for base material on highways is more rigid than for heavy-duty construction.

Research on maximum size of aggregates is expected to have a large impact on the industry. Some work has been done on this subject, and reported to industry, but it is being extended. Samples of aggregates are being received from industry in ¾ x ½-in. size for further testing in the NSGA laboratory. Results of projected tests, according to Delmar Bloem, should check the previous finding that, in spite of reduced mixing water requirements, use of aggregates larger than about ¾ or 1 in. provides no benefit to concrete strength.

There's an important evolution going on in the field of fire-resistant concrete that is important to industry using heavy concrete structures. The sand and gravel industry is being looked upon with more favor by researchers and specification writers than ever before. Siliceous materials used for this concrete are getting better reception.

The railroad ballast market isn't what it used to be. Charles E. Brady reported that this market now takes only about 4 percent of total market, compared to 35 percent 25 years ago. Why? In his opinion, less material is needed, and railroads are producing more of their own ballast.

In studying the ballast market, Mr. Brady came to these conclusions: (1) Most producers are not interested in this market at present prices; (2) most products are prepared to special specifications, decided upon by the railroads and producers; (3) it represents a local sales program, and (4) the Ballast Committee of the Association should be put on a stand-by basis. The Board agreed to keep the committee intact, but that it should work only when needed.

NSGA and NRMCA now have a joint fellowship in research through the Research Fellowship Foundation. One man in each field is at work at the University of Maryland. The engineering department has high hopes that tangible results will be obtained from this research, and it is expected that results will be published technical papers during the next two years.

The Joint Committee on Fiscal Policies is implementing the big and important task assigned to it. A ring binder covering various phases of fiscal affairs has been completed, and a copy was mailed to each member last July. Another Controllers' Conference was held this year on August 15 at French Lick, Ind. Because of the wide interest shown in these conferences and the committee work, the committee recommended the following for the Board's approval: (1) An appropriation of $1,500 be made available for the following year, for the preparation of material for the ring binder; (2) that a 1961 Controller's Conference be authorized, and (3) that no new study on depreciation rates and practices be made until the Internal Revenue Service completes its study. IRS has sent out a questionnaire to industry asking for methods now used in computing depreciation allowances. The Board approved the recommendations.

Public relations continues to be an important task of the Association, and its committee has been unusually active. E. K. Davison, acting as committee chairman, reported that much new material has been prepared and distributed among the membership, to be added to the Public Relations ring binder. He listed no less than nine completed projects for this purpose. Some of those he mentioned are: safety program of the Southern California Sand & Gravel Association, reported to be the best in the country; Los Angeles Zoning story, published by ROCK PRODUCTS magazine (September 1958, p. 82), and three more land rehabilitation programs, bringing the total now covered by the committee to 10. *Please turn page*

NRMCA EXECUTIVE COMMITTEE—Left to right: James Murphy, Ralph H. Anderson, Frank N. Andersen, Quentin W. Best, Edward J. Nunan, W. J. Hicklin, Jr., and J. B. Donovan, president

NSGA BOARD MEETING

continued from page 105

Association staff members have been honored by citations and awards. Mr. Davison happily announced to the Board that Mr. Ahearn has been presented with a citation for more than a decade of devoted services to the President's Conference on Occupational Safety. This was presented to him by the Secretary of Labor on behalf of the U. S. Department of Labor. Mr. Walker and Mr. Bloem have received the Sanford E. Thompson Award from the American Society of Testing Materials. It was awarded for their excellent published work on "Variations in Portland Cement." It was noted also that Mr. Walker has received two previous awards: one, the Frank E. Richart Award from ASTM, and the Roy W. Crum Award of the Highway Research Board.

The joint group insurance plan was the first item of business discussed in the joint NSGA-NRMCA Board Meeting. This insurance has proved to be a valuable aid to increasing association membership. A total of 41 companies have joined the groups to take advantage of the plan. As of Sept. 1, 1960, 110 member companies and association staff are included in the plan, covering more than 2,500 employes and 1,600 plus dependents. An attractive feature of the plan as operated is that rates are 36 percent less than for comparable plans of Blue Cross. Ken Tobin, Jr., announced that there is to be no increase in rates during the 1961 policy year, even though rates for comparable insurance are rising.

A big need of member companies is being filled by the Retirement and Deferred Compensation plans available through the associations. Donald Shepherd, benefit plan consultant to the joint associations, reported that there are 19 retirement programs in operation now—four are profit-sharing plans, and 15 are pension plans. In addition, about 200 plan analyses and recommendations have been submitted to member companies. In considering such plans, Mr. Shepherd pointed out that there is so much flexibility in the program that member companies are not limited to using facilities of the Master Trust to reach the objectives they want.

Member companies also have been enthusiastic about the Long-Term Disability Plan, sponsored by the associations for executives and key personnel. Several programs have been put into effect, even though it became available only in February 1960. It is expected that this type of benefit will become more popular.

William Moore of NRMCA and Harold E. Bender of NSGA were re-elected to 3-year terms as members of the Retirement Plan Committee.

Vincent P. Ahearn, Jr., will return to the Washington staff of NSGA before the end of this year. In the meantime, Vincent P. Ahearn, Sr., is convalescing from surgery and will return to his desk about the same time.

1961 convention dates are set, and plans are going forward for what promises to be an interesting and useful meeting. The 45th Annual Convention of NSGA and the 31st Annual Convention of NRMCA will be held Jan. 20-26, 1961, at the Americana Hotel, Bal Harbour, Fla. The Florida Concrete & Concrete Products Association is lending much cooperation for that meeting and has appropriated a considerable sum to assure a particularly noteworthy ladies program.

The NSGA Manufacturers' Division will hold its meeting Friday afternoon, January 20. Committees will meet January 21 and 22, and the Board meetings will be held Monday, January 23. Also on Monday afternoon, a special session will be held for sand and gravel producers using the navigable waterways.

The convention proper begins January 24 and runs three full days, ending in the afternoon on Thursday, January 26. The program begins with separate sessions for the two associations. A featured speaker at the business session the first day will be Chris Dobbins, president of Ideal Cement Co. The last two days of the meeting will feature simultaneous sessions for the two groups. Gov. Hodges of North Carolina will be the featured speaker at the joint luncheon on Wednesday, January 25.

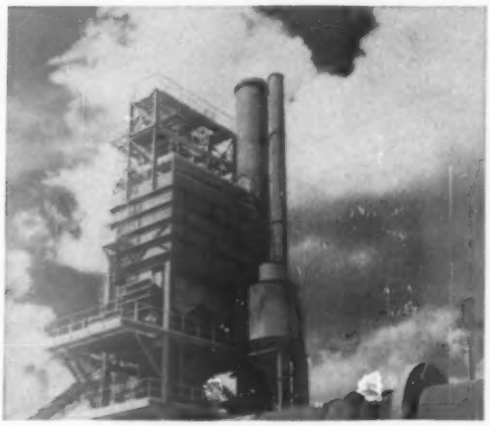
Dates have been set for the 1962 Annual Conventions & Exhibition. It will be held in the new Chicago Exposition Center, Feb. 5-9, 1962. It now is planned that business sessions also will be held at the Center. Headquarters hotel will be the Conrad Hilton. The next semi-annual meeting of the Boards of Directors of the two associations is scheduled for Aug. 20-24, 1962 at the Greenbrier, White Sulphur Springs, W. Va.

Engineering matters of importance to both associations were reported by Mr. Walker and Edward J. Nunan, the latter reporting for the Joint Research Committee. Mr. Nunan announced that his committee will have recommendations for a revised membership plan for the committee at the annual meeting in Florida next January.

Please turn to page 122

KENNEDY lime plant equipment

KENNEDY Stone Preheater



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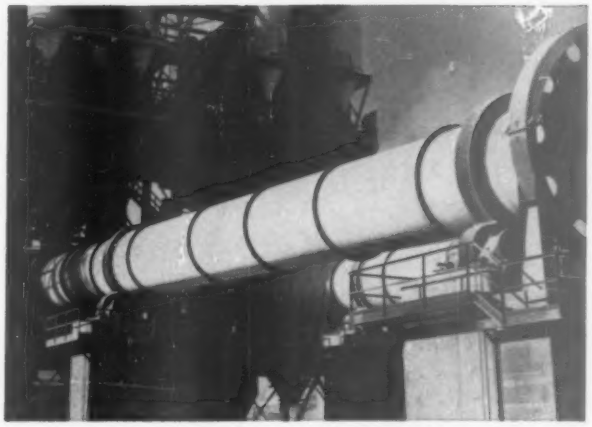

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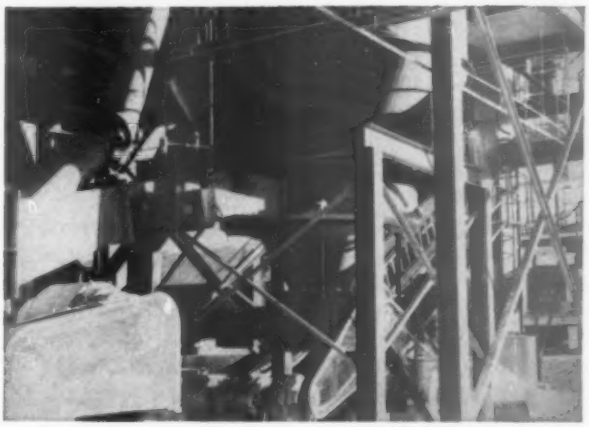

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New research confirms value of fluorine to assimilate free lime in portland cement manufacture

Fluorspar boosts kiln efficiency

by Robert E. Moore*

FLUORSPAR IS AN EFFECTIVE MINERALIZER in commercial portland cement mixes. We can summarize its activities as follows:

- CaO is assimilated in the presence of fluorspar at markedly lower temperatures.
- The rate of mineralization is accelerated by using fluorspar.
- Formation of tri-calcium silicate is enhanced markedly.
- Stabilization of tri-, and β di-calcium silicate in commercial mixes is realized.
- The use of fluorspar as a mineralizer should make it possible to save on fuel and to increase the output of kilns.

Our study used X-ray analysis methods to determine the behavior of CaF_2 in commercial batches. We especially observed the degree of CaO assimilation and the reduction of clinkering temperatures. A commercial batch was used, and the clinkering and quenching procedures approximated those used in the industry (analysis in Table I).

This batch material (see Table I) was furnished in the form of a slurry which had to be dried. The dried batch was then calcined at 1,850 deg. F. to drive off CO_2 and structural water from the raw materials. After calcining, the batch was reground and additions of fluorspar (minus 325-mesh ceramic grade No. 1) in amounts of 1, 2 and 3 percent by weight of the original batch were introduced. The mixtures were mixed thoroughly in a twin-shell blender. Water was added to the mixture and balls about 1 inch in diameter were formed and air dried.

The simultaneous firing of samples containing

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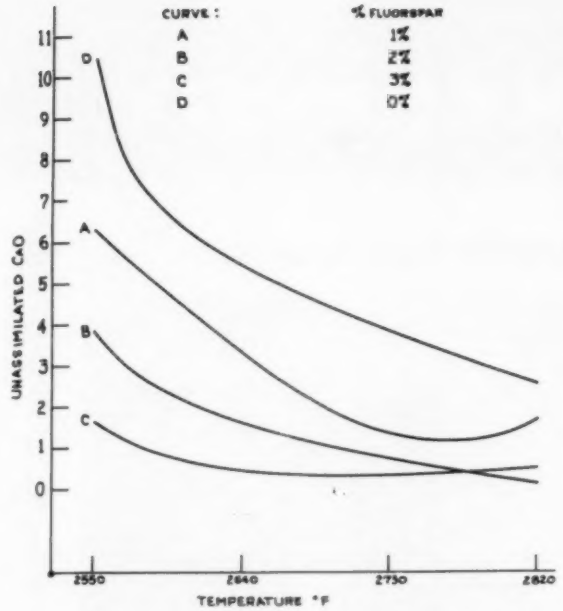

FIGURE 1—When the data on Table II are plotted, they clearly show the significant reduction in unassimilated CaO with additions of fluorspar

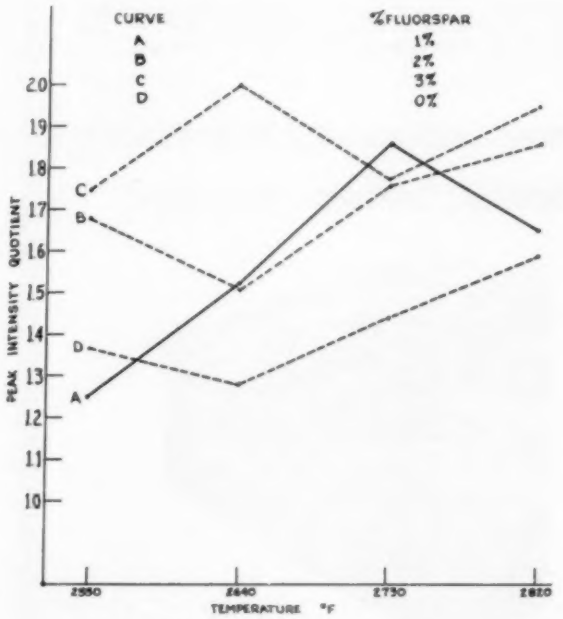

FIGURE 2—Large additions of fluorspar to cement mixes are highly effective throughout the range of temperatures, according to this plot of X-ray intensities

*Instructor, Dept. of Ceramic Engineering, University of Missouri, School of Mines & Metallurgy, Rolla, Mo.

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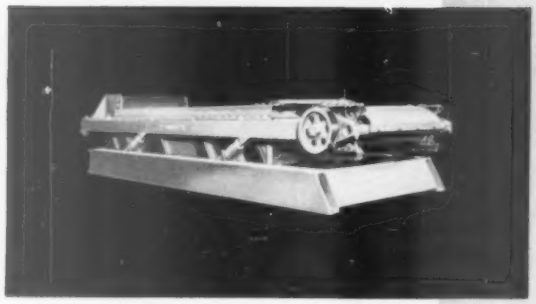

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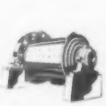

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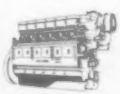

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continued from page 108

0, 1, 2 and 3 percent fluorspar was performed in a gas-fired Remmy furnace. The samples rested on magnesite grain sprinkled onto a mullfrax split. To approximate the clinkering process in a kiln, the samples were introduced into the kiln at about 400 deg. F. below the clinkering temperature and brought to temperature in 10 to 15 min., then held for 30 min. (versus 20-25 min. for this batch as commercially treated). The trial temperatures were: 2,550, 2,640, 2,730 and 2,820 deg. F. The actual clinkering temperature for this particular batch lies between 2,600 and 2,700 deg. F.

At the end of the clinkering process, the samples were withdrawn from the furnace, transferred quickly to fireclay crucibles and blasted with compressed air to quench them. The quenching simulates commercial practice in its attempt to prevent dusting caused by the polymorphic inversion of β to γ dicalcium silicate. The effectiveness of the quench was borne out by X-ray diffraction studies wherein no γ dicalcium silicate was detected.

The samples were subsequently dessicated and divided into two portions—one for X-ray, the other for wet chemical analysis. Each of the samples was analyzed for free unreacted CaO by the method of Leach and Boque, and for fluorine. The fluorine was assumed to be present as recrystallized CaF_2. The dissociated fraction of the CaF_2 presumably showed up as free CaO in the analysis. The calculated amounts of free CaO derived from CaF_2 dissociation were subtracted from the total CaO in order to obtain a proper estimate of the effect of CaF_2 on assimilation of CaO into the clinker. The analytical data and calculated CaO remaining from the raw cement batch appears in Table II.

X-ray diffraction analysis provides a qualitative measurement of the relative amounts of $3CaO{\cdot}SiO_2$ and the β $2CaO{\cdot}SiO_2$ in the samples. The measure of relative amounts is based on a quotient of the peak intensity of selected adjacent lines of the respective compounds in the diffraction patterns of the clinker samples. All of the major lines of these two predominant clinker phases involved superpositions and could not be used. Consequently, two adjacent lines of lesser intensities were selected to provide the peak intensity quotient. The line selected for $3CaO{\cdot}SiO_2$ has a "d" (interplanar) spacing of 1.935 Å, and the line for β $2CaO{\cdot}SiO_2$ has a "d" spacing of 1.966 Å. Even though the dicalcium silicate predominates in portland cement clinker, its selected line for the present purpose had the lower relative intensity.

The X-ray peak intensity quotient was established by dividing the intensity of the $3CaO{\cdot}SiO_2$ line by that of the β $2CaO{\cdot}SiO_2$, giving numerical values between 1.0 and 2.0.

TABLE I—Analysis of the portland cement mix used in this investigation

Constituents	Weight Percent
SiO_2	13.92
Fe_2O_3	2.12
Al_2O_3	2.71
CaO	41.80
MgO	2.62
Na_2O	0.11
K_2O	0.36
SO_3	0.25
Ignition loss	36.13

The quotients characterizing the relative amounts of these two major clinker constituents are given in Table III. This method of analysis does not permit an estimate of quantitative amounts of the phases after successive treatments. But by careful analysis of the data, the temperature ranges can be deduced in which one phase developed more rapidly than the other, and to follow the promotion of the tricalcium silicate development. About half the samples were re-run with excellent duplication of results.

Fig. 1 is a plot in the data of Table II showing the amounts of unassimilated CaO after holding for 30 min. at the specified temperatures. The two intermediate temperature points are significant since they cover the range of temperatures ordinarily needed for clinkering. CaO is somewhat higher than would be realized commercially, as the time of exposure to heat is less than would occur in a large kiln. At 2,640 deg. F. there is an almost linear drop in the amount of CaO with more fluorspar.

One percent of fluorspar has the effect of reducing the CaO content almost to the level attained by firing the unmineralized batch to the highest temperature. The 2- and 3-percent additions are even more dramatic in their effects, promoting almost complete assimilation of CaO. At 2,730 deg. F., the effects apparently approach a maximum. There is not much change beyond this temperature, with the exception of the effect of the 2-percent addition at 2,820 deg. F. The fluorine analysis for this sample appears to be inconsistent with the rest of the data.

Fig. 2 shows the variation in X-ray peak intensity quotient with temperature for the various fluorspar contents. The plots indicate increasing effectiveness of the fluorspar in promoting the formation of $3CaO{\cdot}SiO_2$. The larger fluorspar ad-

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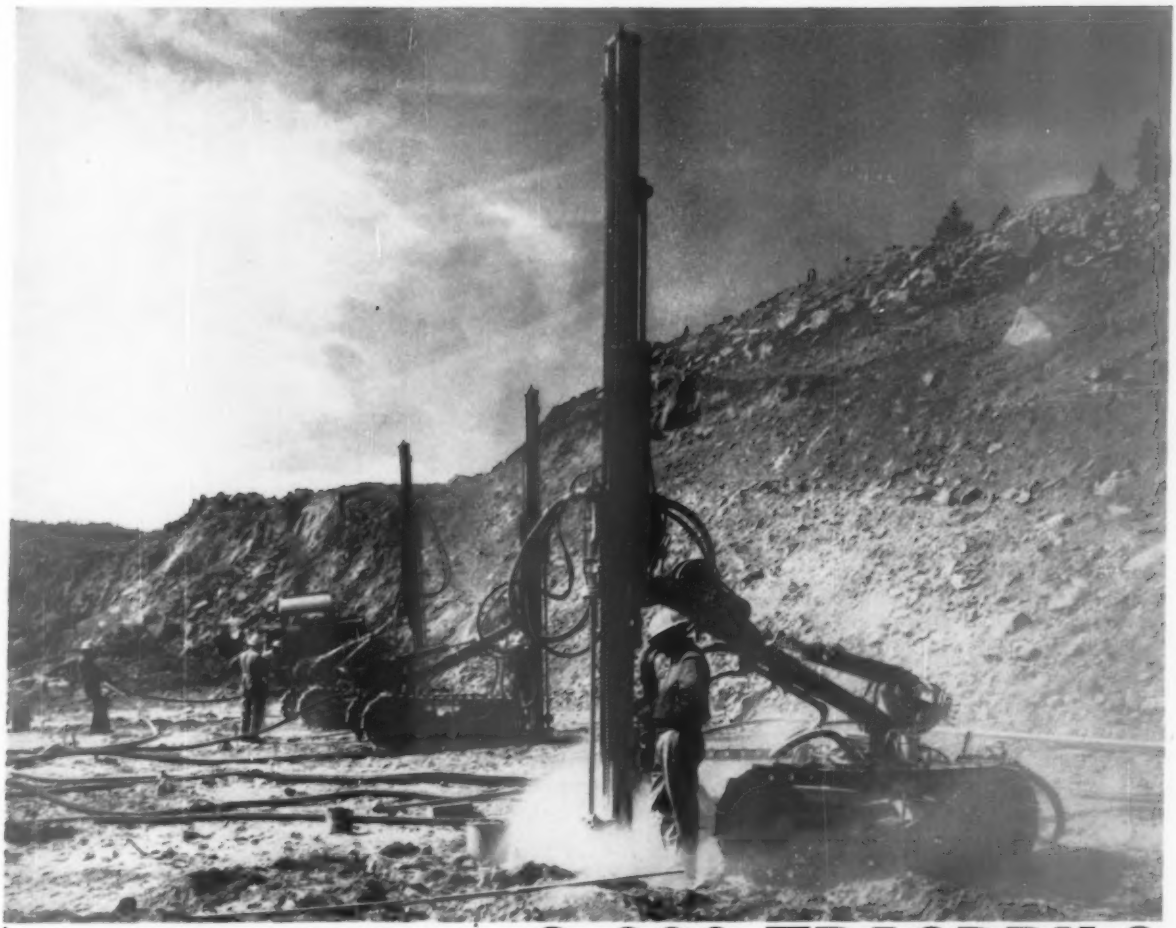

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continued from page 110

ditions are very effective at the lower temperatures compared to the 1-percent additions. In general, this 1-percent addition becomes more effective with temperature. The 2-percent addition is more effective initially and is increasingly effective with temperature. Finally the 3-percent addition is highly effective throughout the entire range of temperature.

It was noted that the 1-percent fluorspar addition at 2,640 deg. F. was almost as effective in promoting CaO assimilation as was firing the unfluxed batch at a temperature 180 deg. higher. Again, the tricalcium to dicalcium silicate ratio resulting from the 1-percent addition is also almost the same at 2,640 deg. as it is when the unfluxed batch is fired at 2,820 deg. F.

Unfortunately this preliminary study is not conclusive: It is quite impossible to duplicate commercial practice. The factors to be considered in the prospective use of mineralizers in cement batch clinker formation include the behavior of the additive prior to the final clinkering operation. That is, whether it is hydrolyzed by the slurry and will be prematurely decomposed. This is especially important in the case of fluosilicates of alkalis or alkaline earths.

The disposition of fluorine itself is another factor but one which is hard to study on a laboratory scale. We observed that much of the fluorine remains in the clinker. The small amount that would be driven off to combine with the immense quantities of water in a wet process may not be worthy of consideration.

TABLE II—Calculation of unassimilated CaO from analytical data

Sample No.	Percent CaO	Percent CaF_2 added based on fired weight	Percent CaO from CaF_2 dissociation	Unassimilated CaO from batch
A1	6.95	1.23	0.66	6.29
A2	3.98	1.23	0.71	3.27
A3	1.88	1.23	0.50	1.30
A4	1.72	1.23	0.01	1.71
B1	4.92	2.46	1.07	3.85
B2	2.42	2.46	0.86	1.56
B3	2.34	2.46	1.29	1.05
B4	1.72	2.46	1.55	0.17
C1	3.67	3.70	1.93	1.64
C2	1.95	3.70	1.68	0.27
C3	2.11	3.70	1.70	0.40
C4	2.19	3.70	1.63	0.56
O1	10.45	—	—	10.45
O2	5.31	—	—	5.31
O3	3.83	—	—	3.83
O4	2.58	—	—	2.58

A—1 percent CaF_2 1—2,550 deg. F.
B—2 percent CaF_2 2—2,640 deg. F.
C—3 percent CaF_2 3—2,730 deg. F.
O—0 percent CaF_2 4—2,820 deg. F.

TABLE III—X-ray peak intensity quotients: $3CaO \cdot SiO_2$: β $2CaO \cdot SiO_2$

Sample No.	30-min. treatment
A1	1.25
A2	1.52
A3	1.86
A4	1.65
B1	1.68
B2	1.51
B3	1.76
B4	1.86
C1	1.75
C2	2.00
C3	1.77
C4	1.95
O1	1.37
O2	1.28
O3	1.44
O4	1.59

The effect of fluorspar on rendering the tricalcium silicate and dicalcium silicate less stable and more difficult to quench, appears not to be active in commercial portland cement batches. The effect of CaF_2 on the volatilization of underfired alkalis was not studied and begs for attention.

The ultimate use of fluorspar in a commercial process will, of course, hinge on the economics involved which will vary with each producer. The addition of fluorspar could seriously damage kiln linings over a period of time. Very frequently it tends to produce compounds that occur in undesirable dusty forms.

We believe that No. 2 ceramic-grade fluorspar (88 to 90 percent CaF_2) will cost about 7.5¢ per bbl. of finished cement. Ground and graded fluorspar is readily available from mines in southern Illinois, as well as from various western districts. It is regularly produced for use by metallurgical, chemical, aluminum and glass-making industries.

We consulted the following Russian references for the use of mineralizers in portland cement burning: Trans. of Conf. on Chem. of Cement (Trudy Savesh Chaneya po Khimii Tsemento) pp. 78-82, 93-105, 1956; N. A. Toropov, B. V. Volkonskii, V. J. Sodkov, Tsement, 21 (4), 12-13, 1955; N. A. Toropov and J. B. Luguinina, Silikattech, 4, 470-1, 1953; E. O. Azelitskaya, Tsement, 19 (3), 13-15, 1953; and P. F. Konovalow, Tsement, 18 (3), 14-17, 1952. Japanese sources included S. Nagai and T. Horado, Journ. Ceram. Asso., Japan (59), 533-37, 1951; S. Nagai and M. Tokahoro, Journ. Soc. Chem. Ind., Japan 39 (6), 183-84B, 1936; and S. Nagai and J. Mayasaka, Journ. for Chem., Japan 37 (6), 303-306B, 1934. Finally, E. P. Flint, ROCK PRODUCTS, 42 (10), 40-42, 1939, covers an American report on the subject. END

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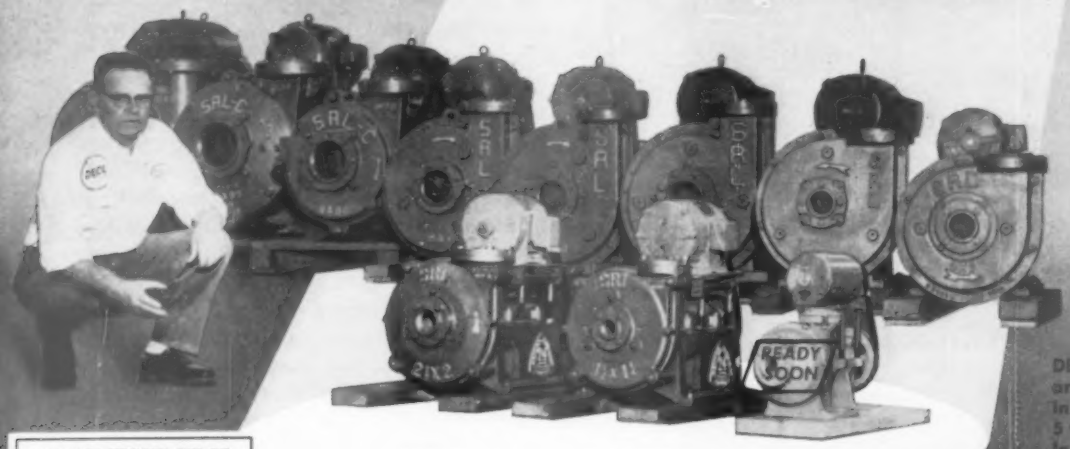

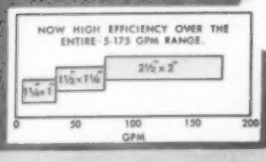

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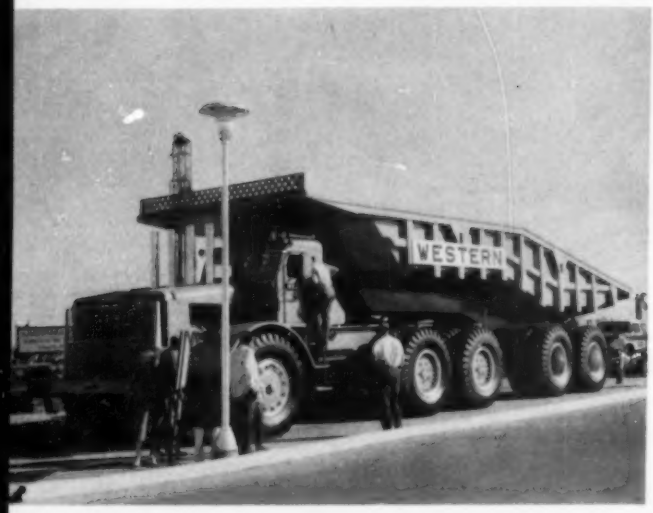
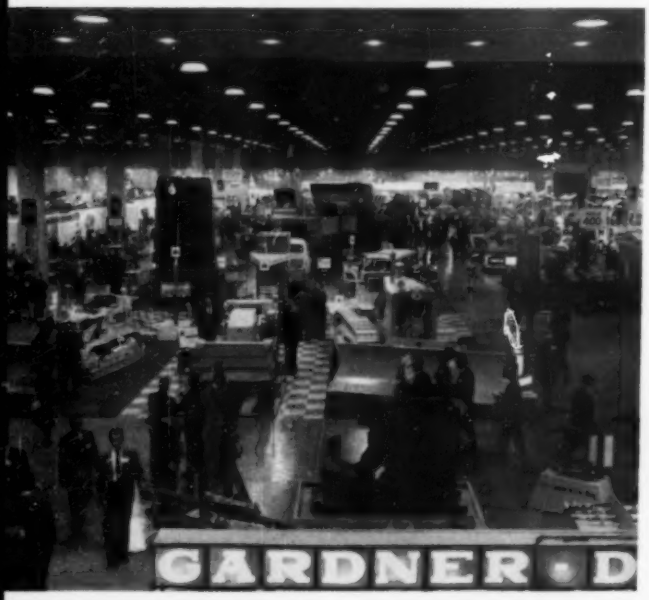




American Mining Congress ponders life-or-death solutions to the mining industry's most vexing problems

Can automation save metal mining?

AN INTERESTING AND VARIED PROGRAM, the newest developments in mining machinery, and the glitter and glamour of Las Vegas, Nevada, combined to draw the largest attendance in history at the 1960 American Mining Congress Convention & Exposition.

Nearly 8,500 representatives of all phases of the mining industry gathered to view exhibits by over 185 equipment manufacturers and to attend the 12 technical and management sessions. A distinguished group of speakers delivered papers on all aspects of the mining industry although, as might be expected in an election year, heavy emphasis was placed on the problems of taxes, tariffs, mineral import quotas and labor relations.

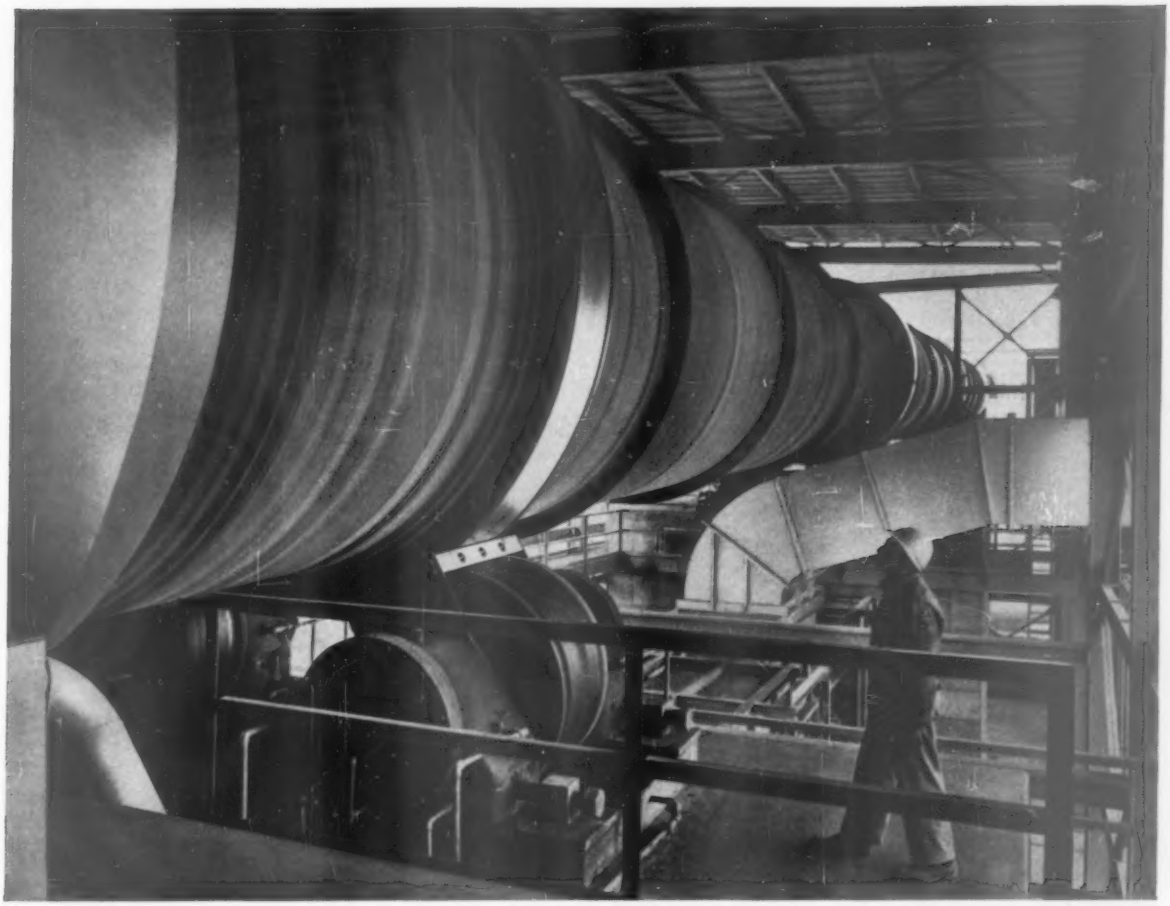
In a speech to a standing-room-only audience of over 900, Barry Goldwater, Senator from Arizona and one of the speakers on the labor relations panel, rapped "election buying" by labor interests. "It is no more proper for labor to buy elections now

Please turn to page 116

ABOVE: The trend toward bigger and more powerful machines continues. A 220-ton giant drew plenty of attention at Las Vegas

CENTER: Over 185 leading equipment manufacturers combined to produce the largest equipment display ever shown to the mining industry in this country

BELOW: Highlight of the four-day meeting was the labor relations session. Sharing the platform were Oscar A. Gleaser, J. S. Parker, Senator Barry Goldwater and Representative John H. Dent

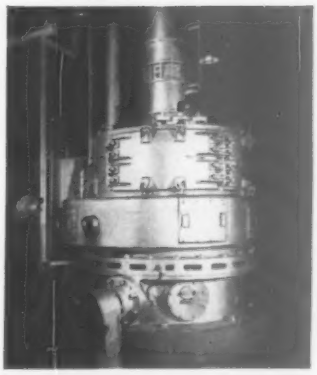


B&W Pulverizer Fires 12 x 450 Ft. Kiln Efficiently, Dependably

Unit Pulverizes from 204 to 216 Tons Daily of Coal Containing as much as 12% Moisture

A B&W EL Type Pulverizer enables the Cape Girardeau Plant of the Marquette Cement Manufacturing Company to direct-fire continually one of the largest kilns in the industry. They operate their pulverizer on a 24-hour day, 7-day-week basis and meet all production requirements. And — after well over two years of rugged grinding service this sturdy pulverizer has never caused an unscheduled plant shut-down.

Throughout the cement and rock products industry, performance records like that turned in at the Cape Girardeau Plant, have earned B&W Pulverizers a reputation for dependable, efficient, and economical grinding service. If you're thinking of building a new cement plant or perhaps modifying your existing facility, a B&W Pulverizer can help you cut operating costs and improve over-all plant efficiency. For the complete story, get in touch with your local B&W representative, or write The Babcock & Wilcox Company, Boiler Division, Barberton, Ohio.



B&W EL Type Pulverizer at Marquette Cement Manufacturing Company has ground an average of over 72,000 tons per year since its installation. No unscheduled shut-downs required for maintenance.

C-220

B&W

THE BABCOCK & WILCOX COMPANY

BOILER DIVISION

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continued from page 114

than it was for management at the turn of the century." Senator Goldwater, outspoken senior minority member of the Senate Labor Committee, continued by attacking the compulsory clauses in the Taft-Hartley Bill requiring union membership within 30 days of employment. "I don't think anyone should be compelled to belong to a church, a union, the YMCA, the American Red Cross or the American Mining Congress, however beneficial," he stated.

MAX KENNARD (standing), vice president of Southwestern Engineering Co., was one of a panel of experts who outlined new advances in the fields of milling and metallurgy

SERIOUS DISCUSSIONS were carried to the extensive display of mining equipment in the giant arena

EDWARD B. CONNERS (standing) described mining methods used by the Permanente Cement Co. at four separate installations

Sharing the platform with Senator Goldwater, in a session that proved the highlight of the four-day meeting, were Chairman Oscar A. Glaesar, vice president & general manager of Western Operations, U. S. Smelting, Refining & Mining Co.; J. W. Parker, vice president of the General Electric Co., and the Honorable John H. Dent, Representative from Pennsylvania.

Although technical sessions covered such diverse topics as General Operating Problems, Industrial Engineering, Open Pit Mining, Management Tools & Techniques, Safety & Health, and Exploration & Geology, three important areas of interest crossed all boundaries and cropped-up in every session. If a preponderance of papers and obvious audience interest are a valid indication, the three topics of greatest significance to the American mining industry are: the application of more effective management tools, particularly in labor relations; more comprehensive maintenance programs, and automation.

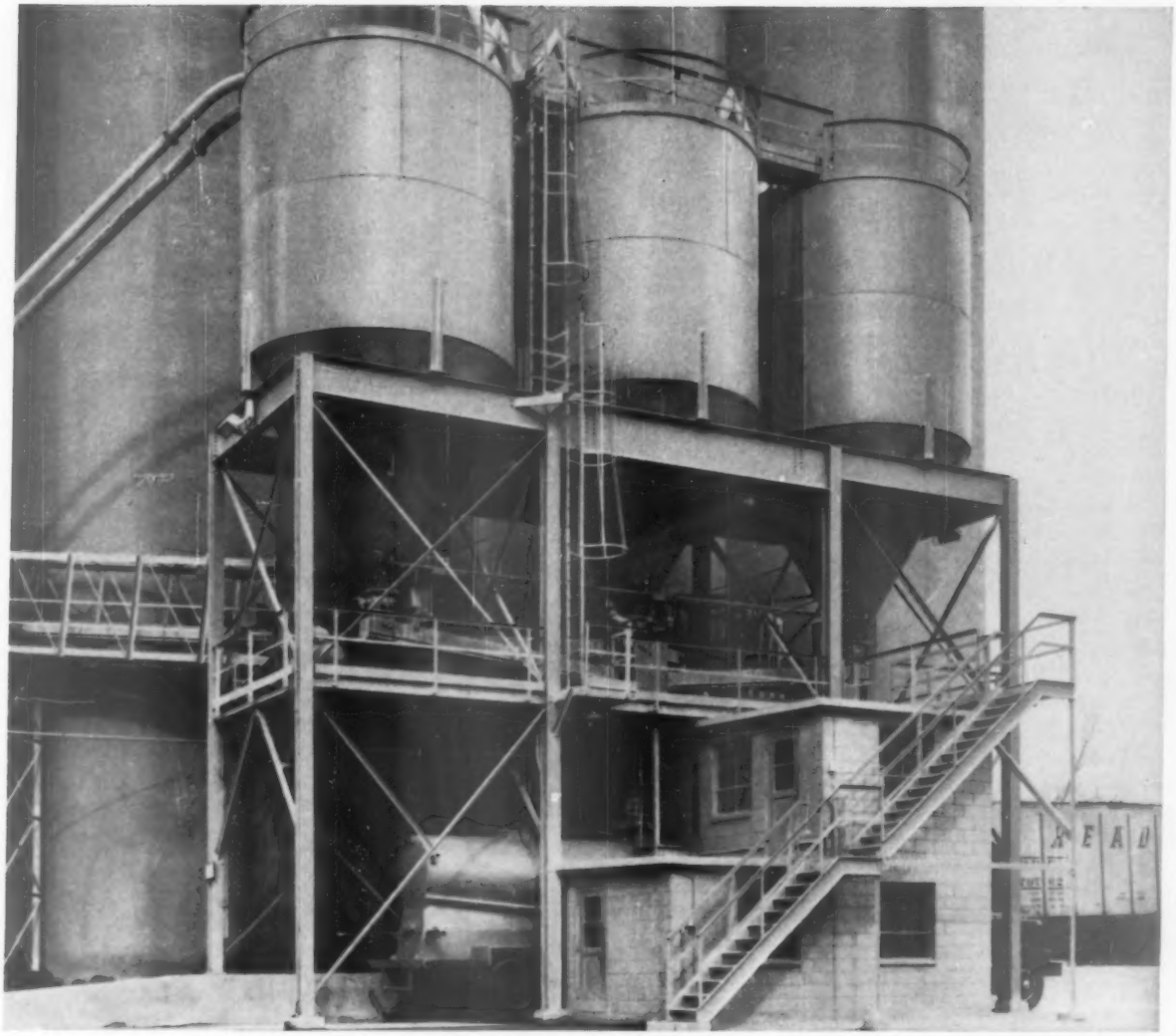
The tools and techniques of automation make a truly centralized plant control a practical reality, according to R. G. Patterson, production manager for the California Portland Cement Co. Centralized plant control will ultimately result in the increase and stabilization of productivity per operating man-hour; consumption of expendable items per unit of production will be greatly improved, and the chemical and physical properties of the end product will be more uniform.

Mr. Patterson illustrated these points with a detailed description of the instrumentation now in use at the Mojave plant of the California Portland Cement Co. These devices, he noted, are doing a profitable job, and that attaining completely centralized plant control is only a matter of time and perserverance.

A key tool in the automation of any mining operation was described by Walter H. Schwedes, a senior engineer of the General Electric Co. Mr. Schwedes gave a detailed appraisal of the use of both analog and digital computers as management supplements in mining, allowing management to "recapture" control of the business, influence rate of growth and increase yield in product and profit.

Substantial savings can be achieved with con-

Please turn to page 121



Why 9 Out of 10 New Bulk Loading Stations Use Airslide Conveyors

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LET'S SCRUTINIZE SILICA

continued from page 100

The calibration chart, Graph 2, is designed to show at a glance the possibilities for chemical calibration or selection of cements between limits of the silicas. The data for this chart come mainly from a study of the work performed on cement and concrete in carrying out the Boulder Canyon project for the Hoover Dam.

The scales on the left and right-hand margins are stated in percentage and usable by both C_3S and C_2S; both are equal. The horizontal distance from one scale to another is dimensionless and may be any convenient distance. By "point to point on a line mathematics" it may be infinite and portray an infinite number of cements.

Table III is based on Type 1, or normal cement. Table IV shows the same normal cement split and is divided into five bands of five percent each of C_3S and the other items in proportion.

If we check the criss-cross lines cutting the diagram, we see how the main diagram works; if one drops the C_3S on the right, the C_2S on the left rises. It may be controlled either from the C_3S or the C_2S side. We proved this diagram by plotting some 40 cements analyzed by the Bureau of Standards and published in the Boulder Dam report. All this indicates how, with great care, a mix and a cement may be worked out that can be satisfactory from almost any combination of mixes. The balancing possible is most effective and valuable.

Study and examination of the materials—with possible discoveries of more adaptable clays, for instance, or dosages from one zone or another of the quarry or quarries—will make possible extraordinary accomplishments.

Table I, at the beginning of this article, and Table II show ranges and tolerances of the silicates. Note the "shortness" of the critical zone between 1,000 and 1,200 deg. F.

Careful study shows the zones of the three final silicates and gives an inkling as to why constant speed is so necessary and successful. Variable speed upsets the sequence, as well as variable feed and wild mixes. The information given by these tables will be interpreted in "Safari No. 3." Then the complimentary items of position in the kiln (length, type of flame and "chain reactions"), intensity and duration, and the rolling and sliding action of the material will be covered.

Cement plants are unusual setups and are becoming more so. Capital in the millions, production colossal—both rising. With reconstruction and new plants, equipment is increasing in size and decreasing in number. More understanding and accuracy are musts. Newer, bigger plants must develop efficiency. Older plants are forced to be more careful. We know that all have considerable latent capacity for quality, production and profit hidden in the old and many new methods of operation. We offer little that is startingly new. Rather, we call attention to the work of scientific men, practical men and writers of the past 50 years, and show how they pieced together practical ideas and job experience.

This "Safari" on the idiosyncracies of the silicates, together with our basic suggestion of the undoubted necessity for constant speed in "Safari No. 1," is designed to prepare for "Safari No. 3." This will be devoted to kiln interpretation and kiln operation.

ROCKY'S NOTES

continued from page 30

assets of $2,137,506. In 1959, its profits were $25,561,679 and its assets $250,932,714. Starting largely with the three principals as stockholders, there are now 30,235. That will do for statistics, here, but you will find interesting details in the book.

It should be remembered that much of the company's expansion was from 1930 to 1940, the era of the Great Depression. Those of us whose memories are long enough at that time often read and heard it expressed in high places—by our foremost economists, politicians and statesmen, including the current President of the United States—that our population and industry were becoming stabilized and that we should no longer look forward to the same rapid growth as heretofore. We must adjust ourselves to new conditions. National Gypsum, obviously did not accept this view and went right on expanding. In all of its 35 years it had losses only in 1928 and 1929.

From the start, the aim of the company was to expand to cover practically all building materials except lumber, and to expand geographically to serve as much of the entire nation as possible. To do that, it has bought existing facilities as well as built and expanded its own plants. It also aimed to supply wherever possible its own raw materials. The company now has a total of 60 plants serving customers in 49 states. Many of its products are the results of its own research and development, and the company's success is attributed in no small degree to its research expenditures and their results. Its first wall-board was the result of the home experiments or research of Joe Haggerty in trying to make a lighter, stronger board by using an admixture of pulped or shredded old newspapers.

Naturally (that is, so far as this company was

Please turn to page 121

Hi-Torque brakes make underground hauling safer; hold 44 tons on 20% grades

This shuttle car is one of several KW-Dart vehicles in use at the White Pine Copper Company mine at White Pine, Michigan. The cars are equipped with B.F.Goodrich Hi-Torque brakes, designed for heavyweight off-the-road vehicles.

Each car weighs 44 tons fully loaded with copper ore. White Pine reports the ability of Hi-Torque brakes to handle such heavy loads safely is an outstanding advantage. With full loads, the vehicles hold on steep grades encountered in the mine, ranging up to 20 percent.

The cars are being used on a round-the-clock basis, 7 days a week, with brakes applied most of the time the vehicles are moving. Yet in several months of operation no maintenance or replacements have been required.

Investigate Hi-Torque brakes for your heavy duty vehicles...now available on several makes of equipment. For booklet write *B.F.Goodrich Aviation Products, a division of The B.F.Goodrich Company, Dept. RP-12, Troy, Ohio.*

Closeup of Hi-Torque brakes on shuttle car wheel. The cars are used over hilly, rocky and muddy terrain.

B.F.Goodrich Hi-Torque brakes

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Accurate to one ten thousandth of one percent. With this new "Direct Reader" Spectrograph, CF&I maintains extraordinary control over each melt of steel. Samples, taken from the blast furnace or open hearth, are sped to the lab via pneumatic tubes. In minutes, a complete spectrographic analysis is ready. This "controlled chemistry" means Grinding Balls and Rods that wear longer, grind more efficiently.

What CONTROLLED CHEMISTRY means in CF&I Grinding Balls and Rods

CF&I takes great care in the selection of steels used in its grinding balls and rods. For example, each size ball from the smallest to the largest (¾" to 5" diameter) must have the proper composition to give the best balance between hardness and toughness. CF&I's modern spectrographic equipment assures you balls with the correct chemistry in relation to their size. In fact, CF&I uses different steels, depending on the ball size required. This chemical control pays off in your mill because CF&I balls have greater resistance to abrasion, withstand impact, and grind at lower cost.

In grinding rods, CF&I observes similar standards. Special analyses of high carbon steels are hot-rolled and machine-straightened to close tolerances, from 1½" to 4" diameter in whatever lengths ordered. CF&I's controlled chemistry techniques result in grinding rods that have excellent wearing properties, resisting bending or premature breakage.

For the complete story on the advantages of CF&I Grinding Balls and Rods, get in touch with your local CF&I Sales Office.

OTHER CF&I STEEL PRODUCTS FOR THE CEMENT INDUSTRY
CF&I Mine Rail and Accessories • CF&I Rock Bolts and Relock Metallic Fabric
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ROCKY'S NOTES

continued from page 118

concerned) they made no secret of it, as others would probably have done. When this writer visited the Clarence Center, N. Y., plant (the company's first), the stacks of old newspapers were obvious, and their use was readily explained. Presumably a patent had already been applied for, but even at that, the readiness to explain was out of the ordinary at that time, and particularly so in that industry. The company, from its start, as noted in the Haggerty memo referred to above, believed in open-handed publicity and the making of friends wherever it could find them. And no one can make us believe thaat this policy was not a large factor in the success of the company, for the more familiar all people are with a company's name and products, not only will it have better sales of the products, but the easier it is to raise new capital. And growth means constantly earning or raising new capital through sales of bonds and stock to the public. Of course, how the company personnel handles it is all important, but favorable publicity does mean a lot to any rock products producer or manufacturer in many ways.

END

AMERICAN MINING CONGRESS

continued from page 116

veyor belts to elevate ore in cases where the processing plant is at a considerable distance above the ore body was the conclusion of D. M. Cooper, senior mining engineer, U. S. Borax & Chemical Corp.; and Peter Nalle, superintendent of mining, Riverside Cement Co. These findings were based on exhaustive studies made by their respective firms on similar oprations. In addition to the ultimate savings of the system there are additional fringe benefits including safety, reduction of maintenance on rolling stock, fewer personnel and ease of increasing or decreasing production.

The distinctly different mining problems encountered by the Permanente Cement Co. at its four widely scattered cement plants was the subject of a paper by Edward B. Conners. Permanente plants are located near San Francisco; in the Mojave Desert east of Victorville, Calif.; near Bellingham, Wash.; and on the Island of Oahu, Hawaii. Problems in providing raw materials for these plants run the gamut: from freezing rain and snow encountered in Washington, to quarry dust control problems at the Hawaiian operation.

The future will see an ever-increasing demand for industrial minerals, according to Bernard J. O'Neill Jr., geologist of the Department of Earth

Please turn to page 122

STARSTEEL
HEAVY DUTY **SPACE SCREENS**

There are three reasons for the exceptional durability of STARSTEEL Screens:

1. Wire drawn from specially alloyed steel, exceptionally hard, yet unusually ductile.

2. Extreme care in fabrication—tight and rigid weaving, special processing to insure a perfectly level, buckle-free surface.

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The longer wear of STARSTEEL Screens promises, not only savings in screen replacements and downtime, but higher output and uniformly higher quality products. *Write for catalog.*

QUICK SHIPMENT *Most weaves, meshes, gauges*

Star will produce screens or cloth from stainless or other steel alloys, Monel, brass, bronze, copper, aluminum and most other metals that can be drawn into wire. Inquiries invited.

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AMERICAN MINING CONGRESS

continued from page 121

Sciences, Stanford Research Institute. The demand for industrial minerals bears a close relationship to population and industrial growth which he expects to continue in the West at a rate substantially above that of the rest of the nation. He also forecast a need to develop new reserves and a great increase in research on the problems of exploration, mining, beneficiation, development of new uses and new markets for these materials.

Industrial engineering as an effective management tool for cutting and controlling costs was outlined in a paper by Richard M. Stewart, director of mining research, and Stewart W. Hurlbut, senior research engineer, of the Anaconda Co. After an intensive study of 23 companies utilizing industrial engineering in regular operations, they decided the following requirements must be met to insure successful results: (1) Complete, firm and sincere management backing, (2) an understanding of the company's operating objectives, (3) staff and line cooperation, (4) a detailed cost accounting system and (5) an understanding of human behavior.

Maintenance came in for a lot of attention both on and off the convention floor. At least a half-dozen excellent papers dealt with one aspect or another of the problem. In one of the most significant, R. Y. Jensen, assistant chief engineer of the M. A. Hanna Co., called upon top management to add a new dimension to their thinking regarding maintenance activities. Decisions concerning sales, production, finance, industrial engineering, planning, purchasing and other management responsibilities very often bear directly on maintenance costs. This is often overlooked by people involved who regard their activities as far removed from the maintenance job. All levels of management must give major consideration to maintenance in every operating decision they make and policy they establish.

Two industry trends were apparent in the equipment displays, the most extensive ever shown to the American mining industry. The trend toward bigger and more powerful equipment continued, and many more highly automated units were in evidence. These ranged from simple mechanical work-savers to the ultimate in "Atomic Age" electronic wonders.

The 1962 Exhibition & Convention of the AMC in San Francisco will be the last held on the traditional two-year schedule. Starting in 1965 these shows will be held every three years. This follows the trend of several other major equipment exhibitions which have chosen a reduced frequency because major equipment modifications do not occur often enough to justify the two-year schedule.

END

NSGA BOARD MEETING

continued from page 106

The Cement & Concrete Reference Laboratory, in existance for more than 20 years, inspects facilities of cement testing laboratories of all types, including private, government and commercial. It is operated by the American Society of Testing Materials at the National Bureau of Standards. Money for its operation comes entirely from the cement industry. Mr. Walker announced a change in policy of the Laboratory, which now will charge an inspection fee amounting to about 25 percent of the cost of inspection. It is expected that all commercial testing laboratories will have been inspected by the end of the next two years, and no laboratory that has not been tested will be recommended.

The test road of the American Association of State Highway Officials in Illinois is a $28-million project. About half of the installed roadway is of portland cement concrete, the remainder being bituminous concrete. The latter sections are already out of test, but work is continuing on the portland cement sections. Mr. Walker indicated that direct comparison of test results between types of roads is difficult at this time because of the traffic schedule. The real picture will have to wait until all analyses have been made, but the project is expected to yield profitable results. Aggregates used on the project were local, and all met the specifications set.

The Joint Boards adjourned until the next meeting in Florida in January 1961. **END**

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5 Ways to increase production, cut your materials-handling costs with CASE loaders

SPEED WORK CYCLES

Balanced power-to-weight ratio . . . exactly the right combination of engine power, traction and machine weight; for faster digging, less wheel slippage.

SIMPLIFY OPERATION

Balanced weight distribution over *55% of empty weight* on rear wheels, provides greater ground-gripping traction. No bucking or raising rear wheels off ground. This, combin[illegible] with torque-converter drive and powerful break-out, gets big loads fast. Convenient shuttle-shift and speed range controls give operator efficient one-handed control of direction and operating speeds.

EXTEND LOADER LIFE

Case balanced construction results in less strain on engine, transmission, less wear on tires. All-welded channel subframe, heavy steel axles and cross-braced box-welded loader assembly provide maximum strength and rigidity.

CUT DOWNTIME

Brake, electrical and steering systems are all easily accessible by merely removing front cover plate. Case-built engine has multiple cylinder heads and removable wet-type sleeves to permit servicing without pulling engine.

INCREASE SAFETY

Note that loader arms are pivoted *ahead* of operator. This exclusive feature gives unequalled visibility plus *maximum operator safety*. Better weight distribution, low center of gravity and wide-tread stability mean greater safety and permits moving bigger loads at higher speeds . . . less bouncing.

Remember, with all their advanced features, Case loaders are economically priced. That's because Case-built diesel engine and all other components and assemblies are covered by one warranty, one service source. There's no split responsibility.

C-TL-536

Choose from three diesel powered models

5500-lb. carry capacity

W-9 handling 1¼, 1⅝ or 2½-cu. yd. buckets. Lifts 11,000 lbs., delivers up to 13,500 lbs. breakout force. Also available with gasoline engine.

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6500-lb. carry capacity

W-10 handling 1¼, 2 or 2⅞-cu. yd. buckets. Lifts 13,000 lbs., delivers up to 17,000 lbs. breakout force.

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9000-lb. carry capacity

W-12 handling 1⅜, 2½ or 3½-cu. yd. buckets. Lifts 15,000 lbs., delivers up to 23,500 lbs. breakout force.

All with:

- 4-wheel drive
- Power-transfer differentials that automatically deliver 25% more power to wheels on firmest footing.
- Torque converter that instantly, automatically provides up to 3 times the push-power to meet load or footing conditions.
- Power shift
- Power steering
- Choice of optional attachments such as pallet or block forks, bulldozer blades, brush stackers and snow removal units that are interchangeable with the loader bucket.

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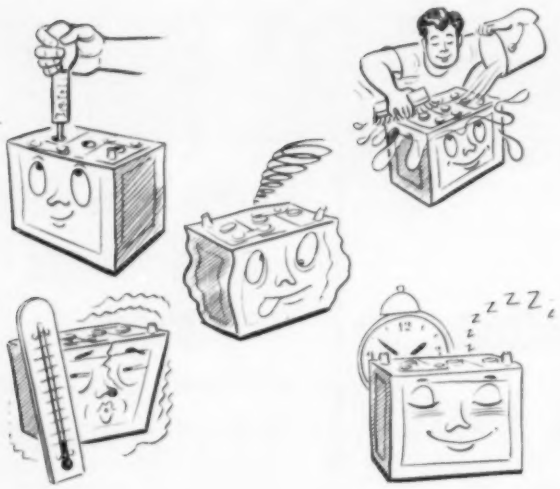
TRUCK TALK

by CHET CUNNINGHAM



You are probably spending too much money on batteries and battery-caused breakdowns on your end dumps, bottom dumps, dozers, loaders, scrapers and every battery-operated rig in your operation. That is the suggestion from Caterpillar Company.

A battery is a wonderful little box and it does a whale of a job, but it must be taken care of. Here are five simple maintenance steps that you can take on every battery-powered rig in your rock operation—they will pay off with longer battery life, fewer battery-caused breakdowns.

1. Make a periodic check of the water level. Add water until it comes about $\frac{3}{8}$-in. above the plates. Do not overfill. The electrolyte then splashes out and corrodes any metal it touches. If the battery requires water more often than once every two weeks, the charging rate is set too high.

2. Wash the battery occasionally with a baking soda solution. Use 1 lb. of soda to 1 gal. of water. This neutralizes the acid which is present on the case. Then rinse the battery with cold water. Use a wire brush on the terminals to remove corrosion, then coat them with a grease or petroleum jelly.

3. Balance the generator output and voltage regulator. This maintains the normal state of the charge. Never let a battery remain discharged for an extended period. This sulphates the plates. This sulphating can be driven off chemically if the battery is charged soon after the battery runs down.

4. Prevent freezing. Never add water at the end of a day's run to your battery. If the weather is cold, the unmixed water could freeze before it mixes with the acid. Add water before a run so it will have all day to mix.

5. Let the battery rest. Never use your electric starter more than 30 sec. at a time. Then allow about 2 min. before cranking it over for another 30-sec. try.

Within two years you should be able to buy a dump truck with a fog and frost-free windshield. They exist now, expensive types for commercial airliners. Libbey-Owens-Ford has one called the "Electropane." It is two layers of safety glass with laminated metallic oxide in the center. The oxide is perfectly clear but conducts an electric current which warms the glass thereby preventing fog or frost. You should see this available as an extra cost item by 1963.

Had a breakdown yet this year because of wet wires or plugs? It can happen on rainy and humid days easily. Here's how to prevent it. Simply waterproof your ignition system with a rustproofing compound. You can paint it on with a brush. Then, be sure of getting fast starts even on those humid days and during downpours.

Having moisture problems in your tool box or your glove compartment on your rock products trucks? If you have been, toss a handfull of household moth balls into the tool box. They will absorb the moisture and prevent rusting of your tools. You also can use a bag of silica-gel for the same job.

"When you argue about the right of way with somebody in traffic, you very well may be insisting on your own last rites!"

END

THE DOLEFUL DUMPER

with Sir Payload Pete (the modern Aluminum Knight)

1.
Rising costs!
Plunging profits!
Upkeep!
Repairs!
We've had it!
Halt, ol' buddy! Lightweight aluminum can save you!
2.
Aluminum, y'see, weighs **half** as much as steel—boosts payloads and profits plenty! It won't rust. It's a cinch to repair. And it's rugged to boot!
3.
Glory Be! We're switching to aluminum pronto!

Photo courtesy of Williamsen Body & Equipment Co., Ogden, Utah

BOOSTS REVENUE $7800 WITH ALUMINUM. By switching to revolutionary new side-dump trailers of lightweight aluminum, the Portland Cement Company of Utah now pockets an additional $7800 yearly per unit over conventional steel models—having paid for the cost differential in less than 6 months. Built by the Williamsen Body & Equipment Co. of Ogden, Utah, these brand new twin dumpers hold 10 cubic yards of limestone apiece. The overall trailer chassis measures 36 feet. Yet, thanks to the use of aluminum in bodies and chassis, the complete unit (including hydraulic cylinders) weighs only 10,900 lbs.

KAISER ALUMINUM*

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FREE BOOKLET! 16 pages of easy-reading facts on payloads, designs, upkeep, operating costs and cargo protection with aluminum. Write today!

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One bag shattered . . . the other has two-way stretch

The *unbroken* bag is made of H&W's new high-strength Expanda-Kraft.

As the lift truck braked to a sudden stop, both bags flew through the air and fell hard against the concrete floor. The regular kraft bag split open — note the spilled flour. Yet, look closely at Expanda-Kraft. *Not a sign of breakage*! Naturally, both bags were identical in basis weight and number of plies.

Expanda-Kraft is stronger, because it's made by a special roll-crepe process. It's resilient, has two-way stretch that soaks up shock. Available in white, semi-bleached and natural.

Expanda-Kraft comes in 40, 50, 60, 70, 80 and 100-pound basis weights. *For samples and information*, write Hollingsworth & Whitney, Division of Scott Paper Company, Chester, Pennsylvania.

EXPANDA-KRAFT®

HOLLINGSWORTH & WHITNEY DIVISION OF
SCOTT PAPER COMPANY

Enter 1257 on Reader Card

NEW LITERATURE

FOR FREE INFORMATION on these items, simply fill out and mail postage-paid Reader Service Card found elsewhere in this issue

Chain slings & connections

WIRE ROPE DIV., Jones & Laughlin Steel Corp., has issued a 16-page illustrated brochure giving the specifications and working load limits for the company's line of alloy chain slings, rings, links and hooks. These new items are the latest addition to the company's line. This includes all standard and custom wire rope; single part, cable laid and braided slings; hand splices; manila and synthetic ropes; hand and power hoists; synthetic and woven wire belt slings, and other custom-engineered lifting products.

Enter 600 on Reader Card

Asbestos fibre booklet

AMERICAN SMELTING & Refining Co. has published a booklet describing test procedures for the evaluation of asbestos fibre. The 18-page booklet gives comprehensive descriptions of 15 standard test procedures for the determination of characteristics in commercial grades of asbestos fibre. These procedures give standard evaluations for fibre length, bulk and density, viscosity, air permeability, filtration, oil absorption, rock and fibre spicules, color, moisture, foreign material, potential index, asbestos cement fibre characteristics, tensile strength and magnetic rating.

Enter 601 on Reader Card

Induction hardening

PHILADELPHIA GEAR CORP. is offering a bulletin on full tooth contour induction hardening of large gears. Included with various photographs and diagrams are such subjects as uniformity of case structure, durability rating increase possibilities and strength ratings. Also listed are complete facilities for large gears. These include: turning equipment, gear cutting equipment, finishing equipment and inspection facilities.

Enter 602 on Reader Card

Crawler tractor

THE EIMCO CORP. has published a comprehensive 32-page book on their recently introduced 100-hp. diesel crawler tractor line. A full-color photograph on the cover shows the bulldozer in action. Inside pages are illustrated with features of this tractor series. Full specifications on the tractor, bulldozers, front end loaders and log loader units in this series are included, as are schematic drawings and coded listing of performance and other features of the line.

Enter 603 on Reader Card

Sprockets bulletin

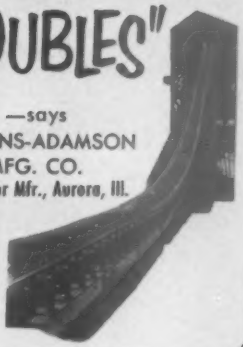
CATERPILLAR TRACTOR CO. has issued an 8-page booklet that covers the features which go into making the company's sprockets. The bulletin is entitled "Sprockets by Caterpillar."

Enter 604 on Reader Card

(Continued on page 128)

"NO MORE LUBRICATION TROUBLES"

—says STEPHENS-ADAMSON MFG. CO.
Conveyor Mfr., Aurora, Ill.



"LUBRIPLATE Lubricants satisfy the 'one-shot' requirements of our conveyor idlers. LUBRIPLATE effectively lubricates each bearing in turn and flows through the hollow shaft to the next bearing. We do not know of a single case of bearing trouble through faulty lubrication where LUBRIPLATE has been used."

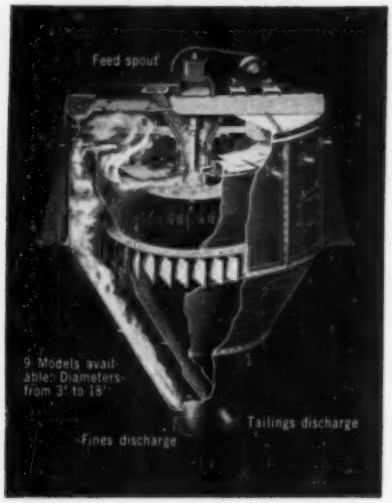
REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

LUBRIPLATE is available in grease and fluid densities for every purpose . . . LUBRIPLATE H. D. S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK" . . . a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

Enter 1213 on Reader Card

In Cement and Aggregates the Word for Air Separation is "Sturtevant"



in cement . . .

Sturtevant Air Separators make possible highly efficient closed-circuit systems. Large circulating loads increase output, eliminate overgrinding. Ball and lining life lengthens, power costs are lowered. Top quality cement results from precise control of finenesses. Standard 16 ft. Sturtevants deliver raw fines up to 70 tph, finished fines up to 260 bph.

in aggregates . . .

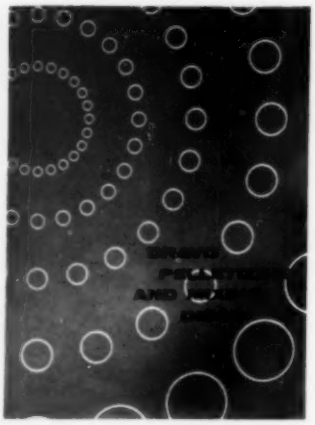
Sturtevant Air Separators classify sand without water, clean sand by de-dusting it. Pre-classification by air can also increase screening production by removing screen-blinding fines. In blending operations, Sturtevants select desired fines from grinder throughput. This graded product is then used to overcome fineness modulus deficiencies.

Send for Air Separator Bulletin No. 087.

STURTEVANT
MILL COMPANY
102 Clayton St., Boston, Mass.
Crushers • Grinders • Micron-Grinders • Separators
Blenders • Granulators • Conveyors • Elevators
Enter 1214 on Reader Card

NEW LITERATURE

(Continued from page 127)



Pelletizing & mixing discs

DRAVO CORP., Materials Handling Dept., has published a 4-page bulletin describing the company's standard line of rotating discs for pelletizing or mixing materials. Entitled "Dravo Pelletizing and Mixing Discs," the bulletin cites design features and advantages of the company's discs, which range in diam. from 39 in. to 16 ft. 5 in. and lists typical capacities. The company's plan for rental of the 39-in. discs for research and pilot plant studies also is noted.

Enter 605 on Reader Card

Cradle idler and belt conveyors

MCNALLY PITTSBURG MFG. Corp. is offering a brochure that gives complete information on the company's cradle idler and belt conveyor. This brochure gives descriptions, photographs, dimensional drawings and capacity tables of the cradle idler, idler H-frames and belt conveyor. Information is given on use of these belt conveyors for underground material handling. The pre-engineered conveyor sections are also described.

Enter 606 on Reader Card

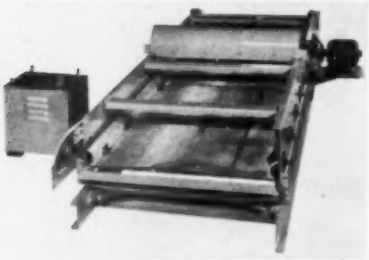
Sand-sort bulletin

WESTERN MACHINERY CO. has released a brochure that describes sand-sort, a free settling classifying tank for removing excess slimes and water from a sand slurry. It is capable of eliminating unwanted size fractions and production of two or more sands of different size gradations.

Enter 607 on Reader Card

(Continued on page 131)

NEW!
FROM UNIVERSAL
A HIGHLY EFFICIENT PROVED PERFORMER AMONG VIBRATING SCREENS NOW TEAMED UP WITH THE LATEST IN MODERN SCREEN HEATING EQUIPMENT . . .
TYPE "K" 4' x 10' SINGLE-DECK



NEW! Laminated Aluminum Conductors Replace Old-Fashioned Cables . . .
NEW! Two 4' x 5' Screen Panels Employed in Split-Deck Principle for Efficient Series Heating and Rapid Screen Mesh Changes . . .
NEW! Latest Style Extruded Aluminum Side-Rails for Uniform Mesh Tension and Equal Distribution of Heat over Entire Screen Area . . .
NEW! Fool-Proof Insulating Method . . .
Write Dept. RP for Free Literature on Screens and Screening

UNIVERSAL VIBRATING SCREEN COMPANY
1745 Deane Blvd. • Racine, Wis.
Quality Screens Since 1919
Enter 1215 on Reader Card

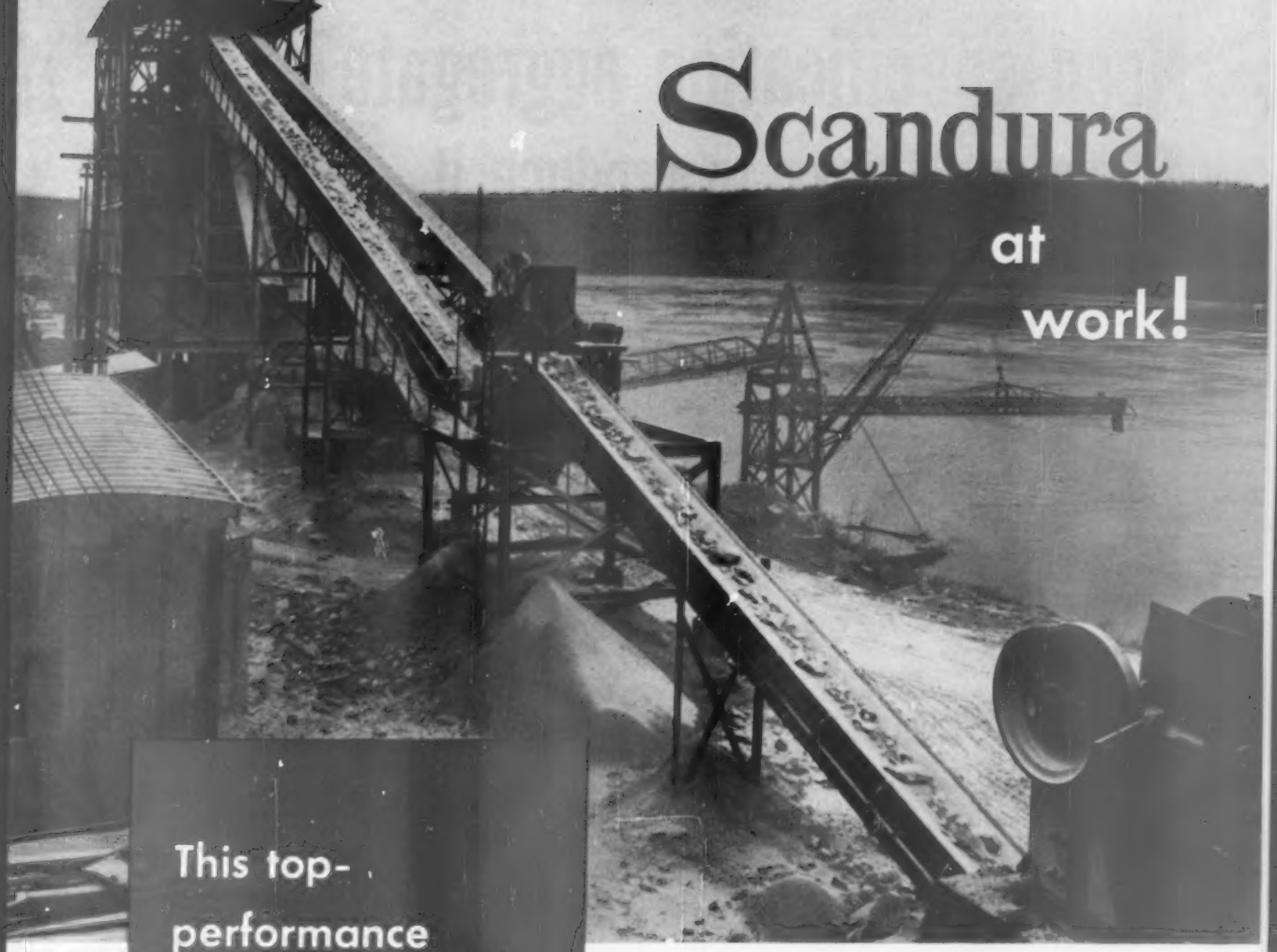
FOR DEPENDABILITY PLUS ECONOMY
REPLACE WITH
INDIAN BRAND

Get the most out of your present equipment. When you need replacements, remember we started in 1913 to build our reputation in the Manganese Steel field for dependability plus economy.

Insist on INDIAN BRAND MANGANESE STEEL

Shovel Dippers • Dipper Teeth
Shovel Treads
Crusher Jaw Plates
Mantles • Concaves
Bowl Liners • Roll Shells
Pulverizer Hammers
Grate Bars • Breaker Plates
Ball Mill Liners • Screen Plates
Misc. Manganese Steel Castings

THE FROG, SWITCH AND MANUFACTURING COMPANY
Carlisle, Pennsylvania • Established 1881
Enter 1216 on Reader Card



Scandura at work!

This top-performance conveyor belting does a standout job in hauling deep-mined Kentucky limestone crushed to 8" size

These Scandura Gold Line Belts on the operation of a Kentucky producer are delivering typical Scandura performance under rough operating conditions.

The belt in the foreground runs under a primary jaw crusher, receiving the 8" sized limestone under a drop of approximately 3 feet. The severe impact and abrasive conditions point up the tremendous wear qualities of Scandura Gold Line Belting. Solid woven carcass plus a cushioned cover of tough PVC make a waterproof, fireproof, strip and gouge proof belt that is made to order for the most severe rock products service.

Check us on your requirements, and install a trial length of Scandura Gold Line in your conveyor system. *The performance you can measure is performance that sells!*

Manufactured by

Scandura INC.

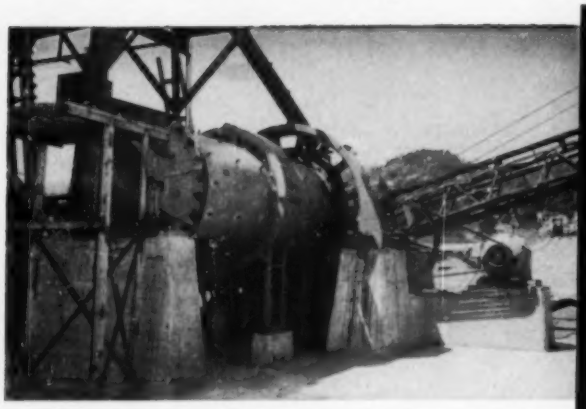
NORTH TRYON STREET AT KESWICK AVENUE • (P. O. BOX 949) • CHARLOTTE 1, NORTH CAROLINA

NEW LITERATURE

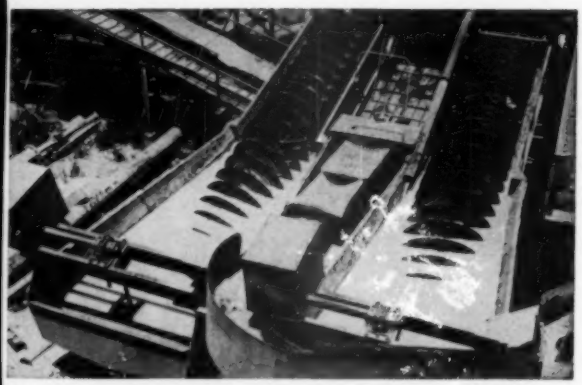
tor dozer and other models in the

Need specification aggregate?

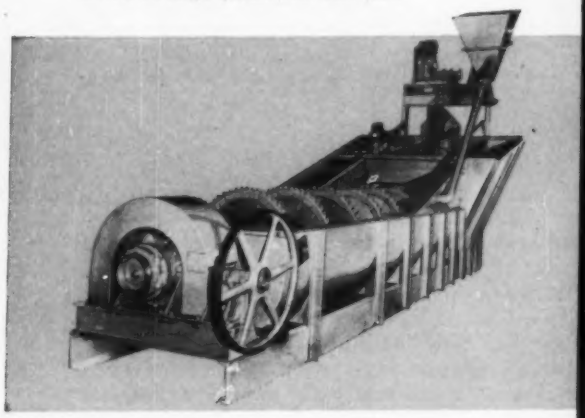
4 low-cost ways to produce it, on location!



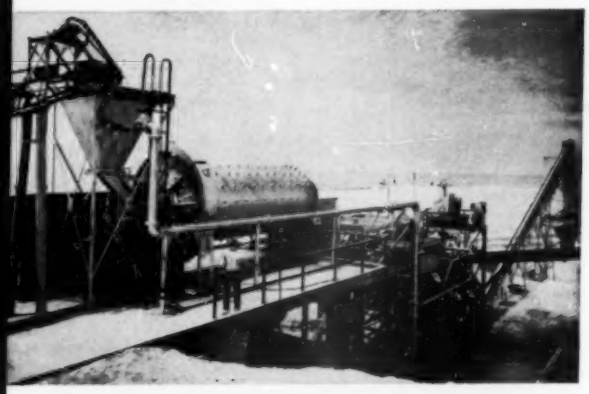
1 *Grinding with Marcy CPD Rod Mills* Grinding stone or waste pea gravel in a Marcy Mill results in a superior, cubical product for blending to meet the most rigid specifications. Marcys have kept many small operators in business; and, have been used on almost all large government dam jobs.



2 *Washing and Classifying with Akins Classifiers* With the Akins Classifier you can wash, deslime, dewater, and *remove or save* sand sizes as desired. A large *working* pool area in classifier is required to do this work...the Akins gives you more working pool area per dollar.



3 *Separating with Akins Heavy Media Separators* Many deposits can be most efficiently treated by the Akins heavy media process. The Akins' large *working* pool area permits close control of products from feed of variable quality or quantity. Reduced media recirculation in the Akins results in lower total horsepower required.



4 *Scrubbing with Marcy Heavy-Duty Scrubbers* Thorough, efficient removal of clay from sand can be accomplished with Marcy Scrubbers. The Marcy principle of small diameter, long length scrubbers gives longer retention time, more contact for scrubbing, less short-circuiting, and lower horsepower...a principle which has been proven on difficult washing of iron ore.

Write for Complete Information

The Company that cares enough to give you the best!

Manufacturing Division

MINE AND SMELTER SUPPLY CO.

DENVER 16	NEW YORK 17	SALT LAKE CITY 1	EL PASO	ALBUQUERQUE
3800 RACE ST.	122 E. 42nd ST.	121 W. 2nd S.	1515 11TH AVE.	701 HAINES N.W.

Licensed Manufacturers and Sales Agents in Canada, Australia, Sweden, England, South Africa
Sales Agents in Peru, Chile, Philippine Islands, Japan, New York City (for Continental Europe) and in principal cities of the United States.

Enter 1267 on Reader Card

NEW LITERATURE

(Continued from page 128)

Core drilling folder

SOILTEST, INC. describes a new core drill rig designed for rugged field service, deep core drilling and versatile operation in a 6-page illustrated folder. The drill, available in both skid-mounted and truck-mounted models, can be used for cores to depths of 4,500 ft. The folder fully describes the rigs' features: the hydraulic drill head, octagonal spindle, heavy duty transmission and power train, automatic chuck, air brake and clutch, and hoists and sealed hydraulic circuit. Also described are related accessories: a line of masts for the drill rig, water pumps, diamond bits and core barrels.

Enter 608 on Reader Card

Consulting engineer booklet

JOHNSON & JOHNSON Engineers-Architects, Inc., has published a booklet which describes the company's execution of various industrial processing plants, board plants for gypsum producers and materials handling plants. In each category, are photographs and illustrations depicting the various plants. Also included is a brief description of the plants.

Enter 609 on Reader Card

Michigan equipment catalog

CLARK EQUIPMENT CO., Construction Machinery Div., has released a four-color catalog describing the complete line of Michigan construction and bulk materials handling equipment. The catalog contains descriptions and full-color illustrations of tractor shovels, dozers, scrapers and excavator cranes. This is the first general catalog to show the 600-hp. tractor dozer and other models in the tractor shovel line.

A section also shows the tractor pipe handler, the exploration tractor, and six special tractor shovel attachments. On-the-job photographs show the equipment in action. One section describes the power train basic to all the machines. Components pictured are the torque converter, four-speed power-shift transmission, and steering and non-steering axles.

Enter 610 on Reader Card

Flexible cushion couplings

DODGE MFG. CORP. has made available a 20-page bulletin in which two types of this company's flexible cushion couplings, one for high speed, high torque applications and another for attachment to flywheels of internal combustion engines, are described. Complete engineering data, photographs, dimension drawings and selection tables cover the couplings. These couplings feature a pan-shaped rubber flexing element. They are recommended to accommodate angular and parallel shaft misalignment and end float, to absorb vibration, and to cushion shock loads. Flanges are furnished with bushings. The couplings are offered in sizes to deliver up to 47 hp. per 100 rpm., with bushings to fit shafts up to 4 in. in diam. Hubs can be ordered bored to size to fit larger shafts, up to 6 in.

Enter 611 on Reader Card

Dispersant products

MARATHON CO., Div. American Can Co., has published a new 31-page illustrated brochure that contains product analyses and information related to the use of Marasperse dispersants, Norlig binders, Maracarb chelating agents and all of the lignosulfonates manufactured by the company.

Enter 612 on Reader Card

(Continued on page 134)

AUTOMATED
Hydral-60
PINCH VALVE SYSTEMS

Controlled circuitry for any operating requirements

- The Massco-Grigsby Hydral-60 System consists of one or more pinch valves with a single automatically operated hydraulic pump.
- Hydraulic pump may be operated by electric motor or by air from normal plant supply system.
- Valves may be the same or different size.
- Valves in the system may be operated simultaneously or independently.
- Control valve may be manual or solenoid.
- Valves may be coordinated and interlocked with other plant equipment to automatically control tank levels, rate of flow, etc.
- Valves are self-supporting and may be operated in any position from horizontal to vertical.
- Valves may be independently controlled for normal or rapid closure.
- Valves may be held fully open, fully closed, or at intermediate positions.
- Remote control to meet individual requirements.
- Controls may be included for automatic emergency operation.
- 3" to 14" I.D. sizes, with 50, 100, and 150 psi line pressure ratings.
- Temperatures to 200° F.

WRITE FOR NEW CATALOG NO. 609

Manufacturing Division

MINE AND SMELTER SUPPLY CO.

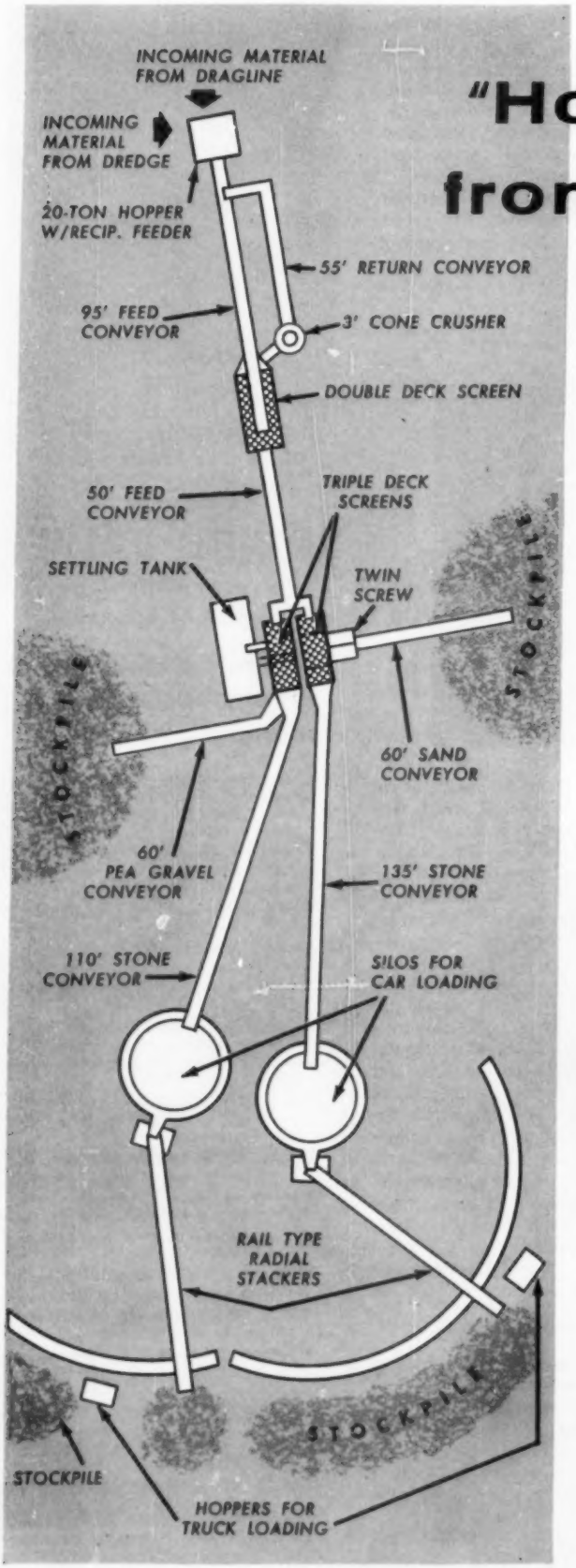
3800 RACE STREET • DENVER, COLORADO
OFFICES AND AGENTS IN PRINCIPAL CITIES

Enter 1217 on Reader Card

"How we set up from underwater

Picture report highlights production set-up of new Lippmann plant at Winona, Minnesota

by Ernie Wuestenberg,
General Manager
Winona Aggregate Co.
Winona, Minnesota



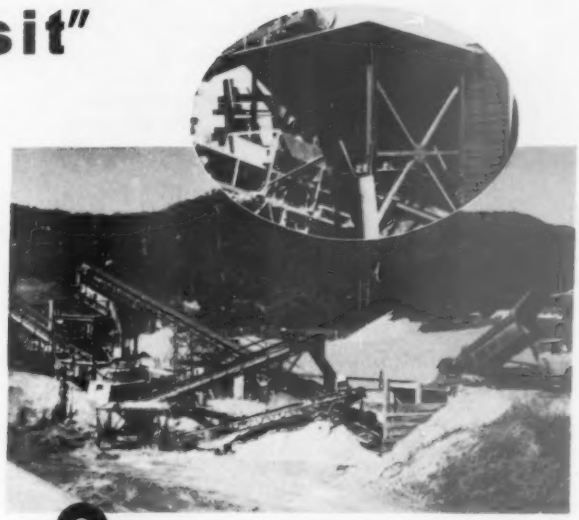
3 **MINUS 1½" MATERIAL** is sized by two side-by-side triple-deck washing screens. Fines are sent to scalping tank and double screw classifier dehydrator, to produce specification sand. In addition, 3 sizes of gravel are produced for ready-mix and other markets.

Lippmann equipment

20-ton feed hopper, with 48" x 7' reciprocating feeder
4' x 14' single-deck 4-brg screen
two 4' x 14' triple-deck 4-brg washing screens
36" x 95' feed conveyor
24" x 55' return conveyor

to produce 350 tons/hr. glacial deposit"

1 **DREDGE SUCKS UP** igneous glacial outwash of about 50% sand and 50% gravel from underwater deposit . . . averages 200 tph input to plant. Additional raw material is supplied by dragline working off-shore . . . is shuttled to plant by 5-yd. trucks (see next photo).



2 **INCOMING MATERIAL** from dragline and dredge converge at 20-ton-capacity hopper (inset). Double eccentric reciprocating plate feeder maintains uniform flow of material . . . feeds double deck screen (upper left), which scalps off plus 1½" material for crushing.

4 **TWIN RADIAL STACKERS,** mounted on rails, provide efficient means of building large-volume stockpiles . . . "do the work of two cranes and crane-operators." At time this photo was taken, stacker output was being fed to bins for immediate truck-haul to customer job-sites.

5 **ENTIRE PLANT** was designed and equipped by Lippmann. Plant has performed steadily, up to 16 hours a day, 6 days a week. Says Mr. Ray Larson, Jr. (President of Winona Aggregate Co., and Sec.-Treas. of parent company Wissota Sand & Gravel Co.), "We have profited by the continued use of Lippmann equipment for over 30 years, in 6 plant locations."

at this plant

36" x 50' conveyor (to washing screens)
three 24" x 60' conveyors (stone stockpiling)
30" x 60' conveyor (sand stockpiling)
two 80' radial stackers
steel framework, supports, spouts, etc.

LIPPMANN
ENGINEERING WORKS, INC.
Milwaukee 14, Wisconsin

W-M-12-60
Enter 1255 on Reader Card

screens

GREATEST CAPACITY, per-square-foot of screen cloth area • EFFICIENT FOR ALL MATERIALS, wet or dry, fine or coarse, hot or cold • EASY TO INSTALL, light-weight, no transmitted vibration • ECONOMICAL OPERATION, low maintenance • FLEXIBLE, 18", 30" & 48" dia. units, single or multiple separations • CLEAN SEPARATION, ACCURATE SIZING, in range from coarse to 325-mesh • LONG SCREEN CLOTH LIFE, less blinding • SELF-CONTAINED, ready to operate.

rock

SWECO Vibro-Energy Separators do many vital jobs for the rock products industry, faster and better. For example: Sizing special-purpose fine sands and silicates. Sizing coarse, medium and fine abrasives. Screening oversizes from milled cement. Sizing fine crushed limestone. Sizing fine crushed lump lime. Scalping hydrated lime. Separating oversize milled stones from water, and other applications.

products

For technical data or free screening demonstration in *your* plant, with *your* materials, write: Dept. 9-14

SOUTHWESTERN ENGINEERING COMPANY

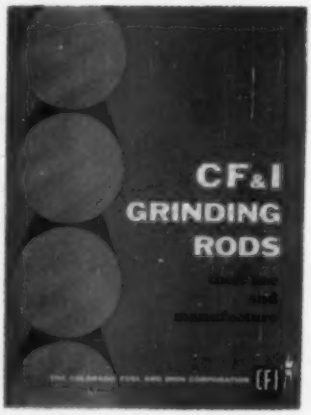
4800 Santa Fe Avenue, Los Angeles 58

Engineers • Constructors • Manufacturers

Enter 1218 on Reader Card

NEW LITERATURE

(Continued from page 131)



Grinding rods

THE COLORADO FUEL & IRON Corp. has made available a 12-page catalog on the company's line of grinding rods —their use and manufacture. The illustrated catalog lists grinding rod requirements and specifications with the use of charts. A section is devoted to ordering grinding rods. Also included are mill practices and operating hints for rod mills.

Enter 613 on Reader Card

Jaw crushers

PIONEER ENG. CO., Div. Poor & Co., Inc., has released a booklet on the company's different models of jaw crushers. With each type of crusher shown, there is included a brief description of the unit, crusher data, capacity rating and a dimensions diagram. A composite table in the brochure shows specifications on the company's complete line of overhead eccentric jaw crushers. Also included is a percentage chart to find the percentage of each size of stone in the crusher product.

Enter 614 on Reader Card

"Cement Engineers' Handbook"

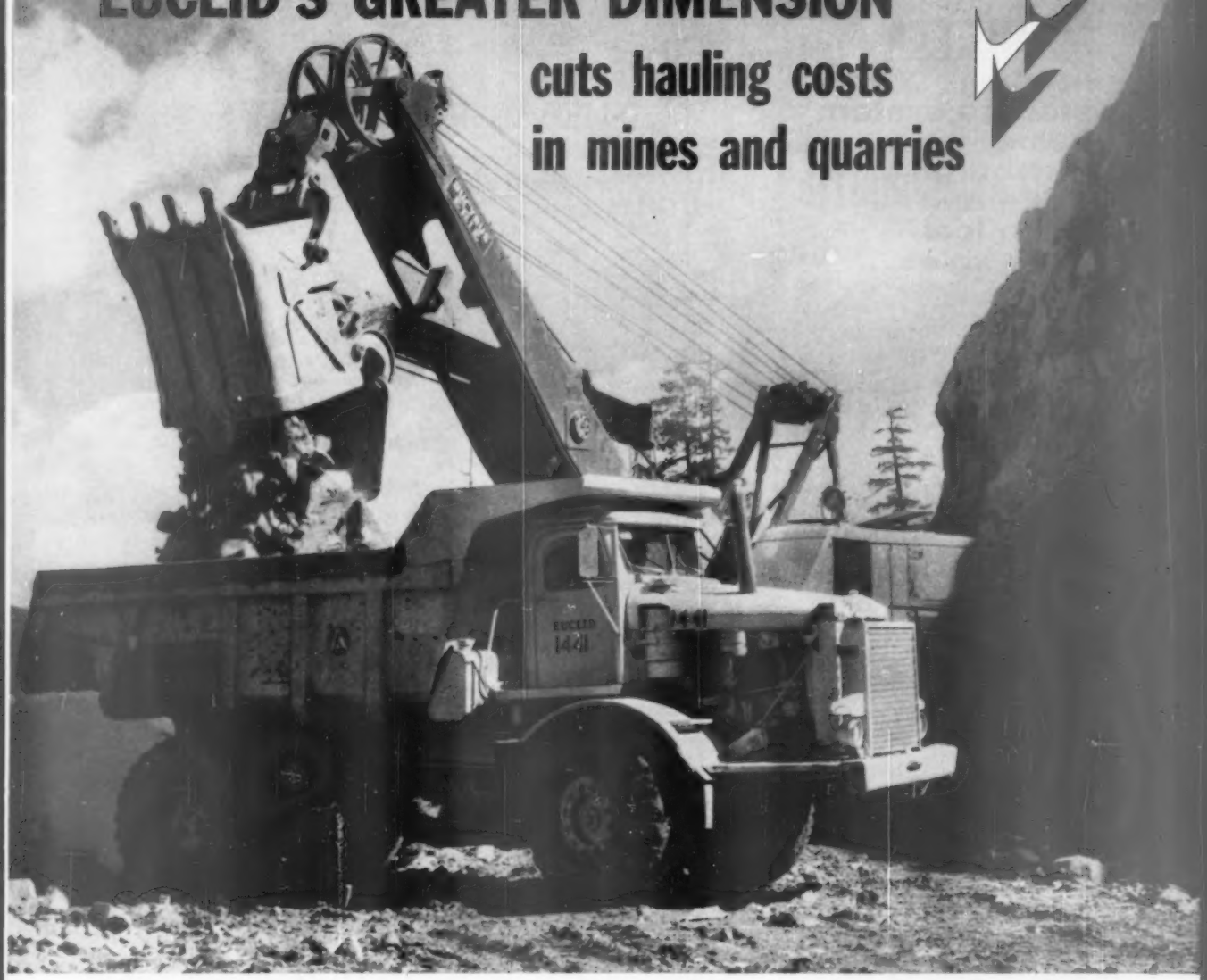
BAUVERLAG GMBH has now published in English, the handbook, "Cement Engineers' Handbook." Included in the contents are such sections as: Quarrying the Raw Material, Proportioning of Raw Mixtures, Choice of Manufacturing Process, Preparation of Raw Materials, Kilns, Cement Grinding Mills and Dust Extraction. Illustrations are included in each section.

Enter 615 on Reader Card

END

Enter 1242 on Reader Card

EUCLID'S GREATER DIMENSION
cuts hauling costs in mines and quarries



Model R-27 has rated payload of 54,000 lbs. and a heaped capacity of 26½ yds. . . . available with Cummins 335 h.p. and GM 336 h.p. engine . . . 4-speed Torqmatic Drive with converter lock-up and Torqmatic Brake . . . dual hydraulic booster steering . . . 18.00 x 25 tires on all wheels . . . rugged body with twin hoists . . . top speed with full payload, 34 mph.

Backed by better than 25 years of specialized experience in building off-highway earthmoving equipment exclusively, Euclid's modern rear-dump line incorporates advanced engineering that is a result of unmatched field experience. From the 10-ton Model R-10 to the big 55-ton "Euc" with two engines and a total of 672 h.p., Euclid Rear-Dumps meet today's requirements for big performance.

This greater dimension . . . in a wide range of capacities, in choice of engines, transmissions, tire sizes, and in type of hauler . . . in the parts and service facilities of Euclid's world-wide dealer organization, too . . . can mean lower hauling costs on mine and quarry work.

EUCLID Division of General Motors, Cleveland 17, Ohio
Euclid (Great Britain) Ltd., Lanarkshire, Scotland

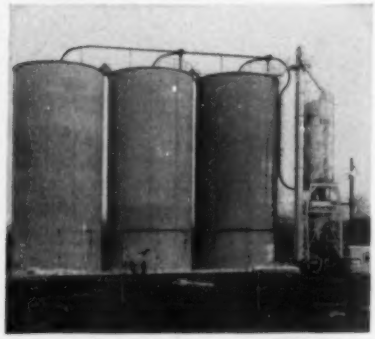
A complete line of rear-dumps with payload capacities of 10, 15, 18, 22, 27, 40 and 55 tons . . . also semi-trailer models of 12, 22, 35 and 50-ton capacity.

GM GENERAL MOTORS EUCLID

EUCLID

FOR MOVING EARTH, ROCK, COAL AND ORE

MARIETTA
terminal storage system helps Pittsburgh Coke and Chemical build sales...



cuts Green Bag Cement Division shipping costs and delivery

Pittsburgh Coke and Chemical's Green Bag Cement Division, needing on-the-spot cement storage for Ohio's booming construction market, turned to Marietta for a solution. The result: a custom-tailored, three-silo terminal storage installation, with 25,000 barrel capacity, located near Marietta, Ohio, to take advantage of economical river transportation. Cement is shipped by barge direct from Green Bag's Neville Island (Pittsburgh) Plant to their new facility; self-contained pneumatic unloading equipment connects to silo piping system to speed discharging and eliminate the need for expensive equipment at each site. The silos gravity feed into a screw conveyor for quick delivery to surge bin and drive-under truck loading.

Green Bag Cement's terminal storage system is typical of how Marietta engineers solve specific industrial storage problems. If you want efficient bulk storage, write today for an engineered solution that will save you time, money and materials for many years . . . ask for our Industrial Storage System Booklet.

Only Marietta makes four types of concrete staves . . . to insure the right one for every installation.

Marietta CONCRETE DIVISION
AMERICAN-MARIETTA COMPANY
Marietta, Ohio
Representatives in principal cities
PRECAST CONCRETE PRODUCTS FOR INDUSTRY, FARM, HOME

Enter 1233 on Reader Card

NEW PATENTS

by OLIVER S. NORTH

Clay

U. S. 2,945,539—A gel cement composition for use in oil wells comprises **portland cement,** Wyoming **bentonite,** accroides gum and water. (to L. H. Eilers; assigned to Dow Chemical Co.)

U. S. 2,945,768—In the manufacture of vitreous silica refractories, for use in glass pots, etc., a mixture of a silica "skeleton" and phosphoric acid is fused and then cooled. The silica skeleton material is made by removing cations other than silica from minerals such as **kaolin, attapulgite, mica** or **vermiculite.** (to R. E. Grim; assigned to Minerals & Chemicals Corp. of America.)

U. S. 2,948,632—In a process for improving the surface characteristics of **kaolin** particles, a rosin amine stearate coating is applied to the particles. The product is especially suitable for use in lithographic inks. (to C. G. Albert & J. R. Wilcox; assigned to Minerals & Chemicals Corp. of America)

U. S. 2,948,678—Method of beneficiating calcium and other meta- or sub-**bentonites** so as to increase mud "yield" when used in well drilling muds. The clay is mixed with soda ash and a co-polymer of specified type and viscosity. The product compares favorably with Wyoming bentonites. (to F. Turner & E. T. Dillon; assigned to Magnet Cove Barium Corp.)

British 839,789—An emulsion for treating pruning cuts on trees and shrubs consists of copper-8-quinolinate, bitumen, stearine pitch, lignosulfonic acid, **bentonite,** caustic potash and water. (to L. C. Bradshaw; assigned to I.B.E. Ltd.)

Fluorspar

U. S. 2,915,443—An improved electrolyte for use in the reduction of alumina comprises 4-9 percent salt, 6-9 percent **fluorspar** and the remainder cryolite or mixed sodium and aluminum fluorides. (to W. G. Wallace and H. Skentze; assigned to Aluminum Laboratories Ltd.)

British 821,641—A flux for submerged arc welding is made by grinding and mixing quartz, pyrolusite, and **fluorspar,** and melting the mixture along with graphite. The material is then cooled and granulated. (to Z. Duben, M. Zajic, Z. Lehky, V. Dvorak and J. Miskovsky; assigned to Ustecke Sklarney)

British 822,193—A fusible jointing composition for joining ceramic materials securely to metal comprises about 22 percent **fluorspar,** 26 percent calcium hydroxide, 34 percent boric anhydride and 18 percent sodium silicate. (to D. Radford and C. Coulson-Smith; assigned to Rolls-Royce Ltd. and British Oxygen Co. Ltd.)

Cement

Canadian 600,936—Design for a vertical chamber furnace particularly adapted to the production of **portland cement** clinker. Various advantages are claimed, including production of pieces of clinker of such size that they can be fed directly to finish mills without preliminary crushing. (to R. L. Metcalfe & V. E. Metcalfe)

Canadian 601,535—Design for an efficient tower for use in the cooling of ground **portland cement,** cement raw materials and the like. The tower has heat conducting walls which are cooled, as by spraying with water. (to P. B. Nielsen; assigned to F. L. Smidth & Company)

British 840,403—In the manufacture of artificial marble showing variegations and veins, dry **white portland cement** is mixed with powdered **marble** and a colored inorganic pigment, and the mixture wetted, kneaded and molded. Assigned to Similpierre Export S.r.l.)

(Continued on page 138)

*Copies of United States patents are available at a cost of 25 cents each (photostat copies of foreign patents at 30 cents per page) from The Commissioner of Patents, Washington 25, D.C. For convenience, coupons, each good for one copy of any patent, may be purchased from that official at the rate of $5.00 per 20-coupon pad or $25.00 per 100-coupon pad.

ARMCO DREDGE PIPE

Helps Widen Louisville-Portland Canal

Armco Special Analysis Steel Pipe will carry 2½-million cubic yards of mixed sand and silt for the Louisville-Portland Canal dredging job near Louisville, Kentucky. The canal is to be widened from 200 feet to 500 feet.

The dredging contractor, Dunbar and Sullivan Dredging Company, is using 1000 feet of 22-inch inside diameter Armco Pontoon Pipe in 40- and 80-foot lengths. Wall thickness of the pipe is .438". As an extra service, the ball joint, seen at left in photo, was welded on the pipe before it left the factory. Accessories used in this and many other dredging operations throughout the country are Armco standard fabricated elbows and Armco standard shore pipe.

Armco Special Analysis Steel Pipe is made of special steel developed by Armco to withstand abrasive materials and rough service. Write us for the free illustrated folder on Armco Special Analysis Steel Pipe. Armco Drainage & Metal Products, Inc., 6790 Curtis Street, Middletown, Ohio.

ARMCO DRAINAGE & METAL PRODUCTS

Subsidiary of ARMCO STEEL CORPORATION

OTHER SUBSIDIARIES AND DIVISIONS: Armco Division • Sheffield Division
The National Supply Company • The Armco International Corporation
Union Wire Rope Corporation

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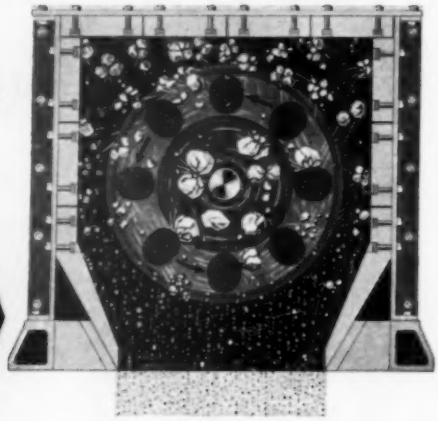
WET OR DRY...

SIZE AND UPGRADE YOUR AGGREGATES FOR BOTH CONCRETE AND BITUMINOUS MIX WITH

STEDMAN CAGE MILL



The Stedman Single-Cage Mill reduces Gravel and Stone, either wet or dry, via the Internal-Impact Principle. See cut above. It pulverizes unsound material to be passed off with fines—the discharged product going to wet screens, log washer, jigs, or heavy media process.

The Stedman Single-Cage Mill not only upgrades your product, but also gives the greatest percent of crushed surfaces for Black Top Mix. Example: "Crush your—2"+¼" including pea gravel to a product of ¾" X 0, screen out minus ¼" sand and furnish a specification product for Bituminous Mix with 65 to 100% crushed particles."

Variation of speeds and type of cage result in a wide variety of product sizes. Wire or write for information.

STEDMAN FOUNDRY AND MACHINE COMPANY, INC.
Subsidiary of United Engineering and Foundry Company
AURORA, INDIANA, U. S. A.

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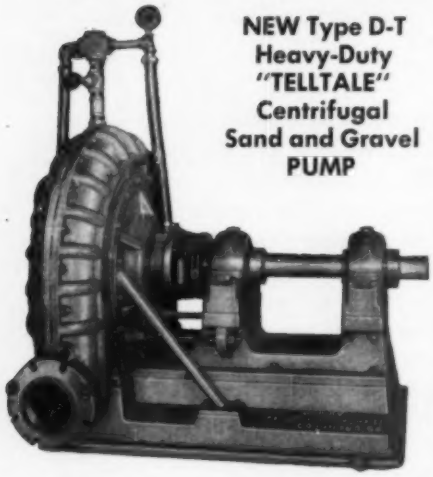
NO OTHER PUMP CLAIMS BETTER PRODUCTION THAN "TELLTALE"



NEW Type D-T Heavy-Duty "TELLTALE" Centrifugal Sand and Gravel PUMP

Reports of much greater "Telltale" production than pumps of the same size replaced at same spots and under same conditions are common. Reports of substantially greater production than replaced pumps of larger sizes are not rare.

AS LOW IN DOWNTIME AS IT IS HIGH IN PRODUCTION

"Telltale" is the only pump that warns when it's time to reline. Air sucked through periphery ports causes pump to lose its prime. Pumping stops. Water leaking through the ports signals that the shell liner and the surrounding belt of packing have worn through.

Available with either tough semi-steel or best-in-the-long-run Ni-Hard wearing parts in 4", 6", 8", 6 x 8" suction and 8 x 10" suction. Now available also in either alloy, 45 and 90° extra-heavy long-radius flanged elbows. Write for Type D-T Heavy-Duty folder and prices.

Pekor Iron Works, Inc.
ESTABLISHED 1892
LOCK DRAWER 909 FAIRFAX 2-4020 COLUMBUS, GEORGIA

Enter 1221 on Reader Card

NEW PATENTS

(Continued from page 136)

Aggregate, lightweight

U. S. 2,948,948—In the production of **lightweight aggregate,** fly ash is mixed with a binder, the mixture pelletized and the pellets heated at about 2,200 deg. F. (to V. J. Duplin, Jr. & G. D. Ebersole; assigned to Babcock & Wilcox Co.)

Canadian 601,332—In the production of **expanded clay** or **expanded slate** lightweight aggregate in an oven type furnace, the hearth is exteriorly cooled to prevent sticking of the material being bloated. (to H. A. R. Holm)

British 840,632—This apparatus for foaming **blast-furnace slag** can be adjusted quickly without interrupting the operation and controlled according to the varying properties of the outflowing slag. (to J. Kuzela & F. Vavrin)

Vermiculite

U. S. 2,945,820—In the continuous production of exfoliated **vermiculite** meeting exacting standards, control is maintained by periodically determining the percent shrinkage of the newly exfoliated material taken from the kiln discharge stream and then adjusting the furnace heat as needed. The sample is subjected to at least one wetting and drying cycle, preferably using the method described in Canadian Patent No. 598,269. (to G. E. Ziegler; assigned to Zonolite Co.)

U. S. 2,947,647—Use of expanded **vermiculite** and swelling **bentonite** in a composition for making wood fiber base acoustical tiles or fiberboard. (to J. C. Hart & E. A. Lauring; assigned to Minnesota & Ontario Paper Co.)

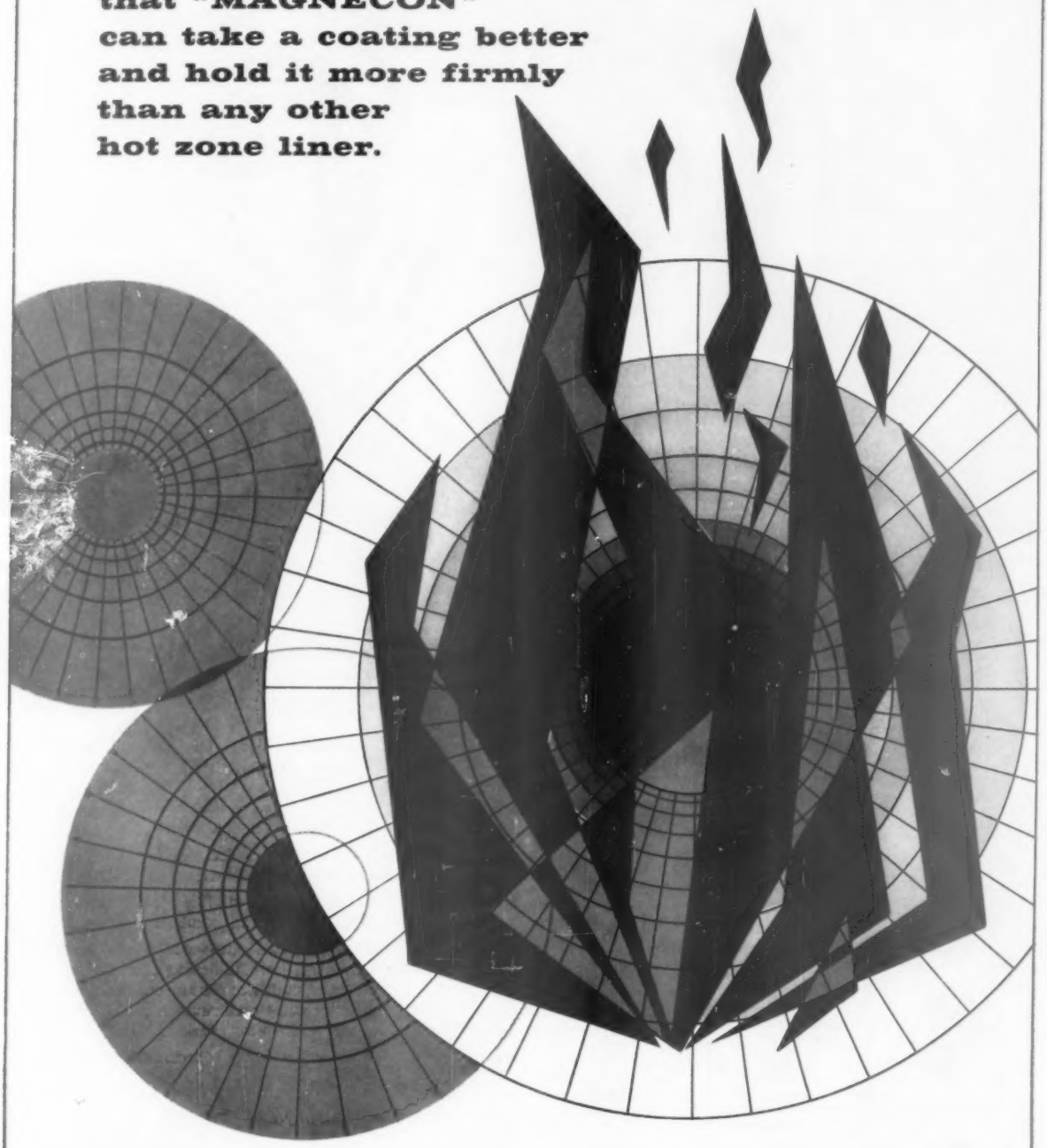
Pumice

U. S. 2,946,693—In the production of porous or cellular products from **pumice, obsidian,** etc., the pulverized rock is mixed with sodium nitrate and sodium hydroxide, fired at 1300-2000 deg. F. until the material melts and foams, and the foamed material quenched. (to A. E. Booth; assigned to Armstrong Cork Co.)

British 839,694—Use of pulverized **pumice** in a dry powder formulation which is mixed with a silicate solution just prior to use thereof as a paint for buildings, etc. (assigned to Ponce Industrille Francaise)

END

It has been demonstrated repeatedly that "MAGNECON" can take a coating better and hold it more firmly than any other hot zone liner.



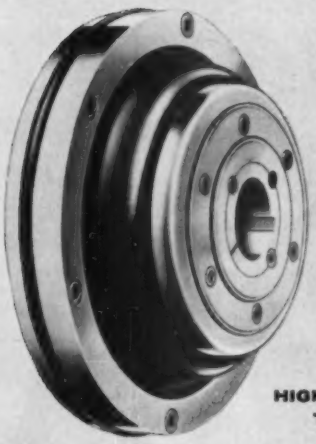
REFRACTORIES

CANADIAN REFRACTORIES LIMITED

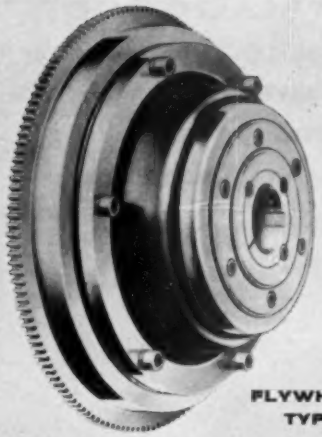
CANADA CEMENT BUILDING, MONTREAL, CANADA

2462

Enter 1270 on Reader Card



HIGH SPEED TYPE



FLYWHEEL TYPE

NOW! THE COUPLING WITH THE 4-WAY FLEX

IN TWO NEW TYPES — HIGH SPEED AND FLYWHEEL

STANDARD TYPE

DODGE **Para-flex**

Industry asked for this—and here it is! Dodge Para-flex, the unique coupling that swallows up misalignment, is now available for high speed applications, and for high torque at either high or low speed.

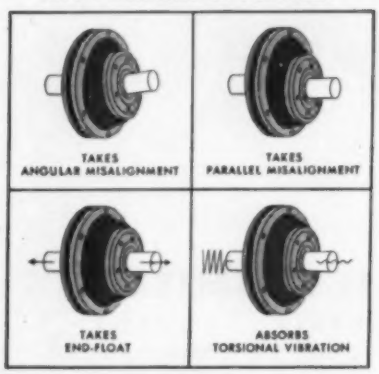
The new Dodge High Speed Para-flex is specially designed for operation with motors and internal combustion engines that turn up to 5230 rpm.

The new Flywheel Para-flex, with the same capabilities, has a flexing element that bolts directly to the flywheel of internal combustion engines.

Like the Standard Type (with capacities up to 2000 hp at 1080 rpm) these new Para-flex Couplings feature a modern, tire-like flexing element that handles angular and parallel misalignment, end-float (or any combination) and absorbs torsional vibration. The amazing performance of Para-flex Couplings is a matter of record in thousands of installations.

Ask your Dodge Distributor—or write us for new technical bulletin.

THE 4-WAY FLEX OF PARA-FLEX



DODGE MANUFACTURING CORPORATION
2600 Union Street, Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

CALL THE TRANSMISSIONEER—your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look under "Dodge Transmissioneer" in the *white* pages of your telephone directory, or in the yellow pages under "Power Transmission Equipment."

Enter 1268 on Reader Card

NEW MACHINERY

FOR FREE INFORMATION on these items, simply fill out and mail postage-paid Reader Service Card found elsewhere in this issue

1961 truck roundup for rock products industry

FORD'S TRUCK LINE for 1961 (below) marks the greatest expansion in this company's history. More than 100 heavy-duty models are offered to meet virtually every truck need. Diesel engines up to 220 hp. are available for the first time and they supplement a group of 13 gasoline engines with power up to 266 hp.

The complete line of durable, reliable haulage tools features many advances in economy and versatility, including a number of engineering refinements. Single headlamps reduce replacement costs; redesigned hoods and front ends permit easy access to the engines. (Ford Div., Ford Motor Co., P.O. Box 608, Dearborn, Michigan.)

Enter 200 on Reader Card

THE CHEVROLET TRUCK LINE for 1961 (right) includes and extends many of the highly successful innovations introduced the previous model year. These include independent, torsion-bar front suspension, improved rear suspension and important styling changes.

All 1961 models have high-resistance spark plugs and a secondary coil to suppress radio and television interference. All models have heaters to give up to 10 deg. warmer cabs, and optional heavy-duty 12-leaf springs are offered for particularly heavy duty. For city operation an optional crankcase ventilating system is available. Unburned hydrocarbons are channeled from the crankcase back to the combustion chamber to be burned with the fuel. (Chevrolet Motor Div., GMC, Detroit 2, Mich.)

Enter 201 on Reader Card

THE 1961 DODGES (left) will be offered to rock products producers in 140 entirely new basic models with a choice of 11 gasoline engines or 8 diesel engines. Conventional 6 or 8-cylinder gasoline engines will range between 101 and 228 hp. Diesel engines for heavy-duty applications will range between 160 and 250 hp.

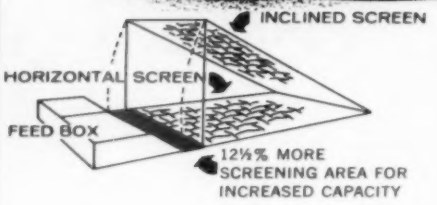
Largest unit in the line is a giant tractor truck with diesel engine. Offered in a choice of five wheel bases, it has a gross combination weight rating of 76,800 lb. (Dodge Div., Chrysler Corp., 7900 Joseph Campeau, Detroit 31, Mich.)

Enter 202 on Reader Card

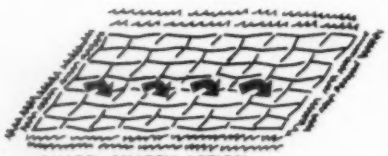
(Continued on page 144)

What you should know about screens

Should your screens be horizontal? Yes. With a screen in horizontal position, you get 12½% greater screening area and up to 30% greater screening capacity than with an inclined screen of the same size. Gradation is not only much faster, but more accurate, because in horizonal position, the full area of each screen cloth opening is utilized. This greater hourly production and more accurate grading of strict specification aggregate has been proved by 25 years' profitable service of Cedarapids Horizontal Vibrating Screens.

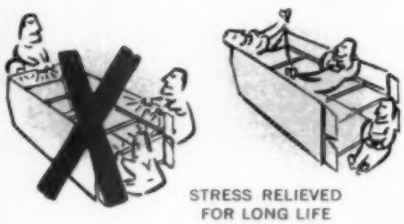


Should your screen have a spreader feed box? Yes. When correctly designed, a feed spread box absorbs the shock of dumped rock and distributes material evenly over the full width of the screen. Spreading material facilitates quick removal of fines in the first few feet of screen area, and reduces wear. A properly engineered feed spread box is standard equipment on Cedarapids Horizontal Vibrating Screens.

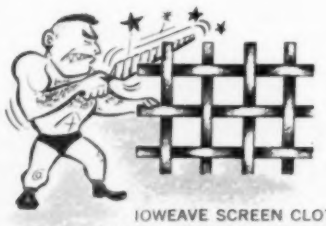

SHARP, SNAPPY ACTION
ASSURES FAST SEPARATION

Should screen action be "cushioned"? No. The very nature of the job of separating different sizes of stone demands sharp, vigorous action of the screen decks. The required "snap" cannot be obtained if the action is air-cushioned. The lively, snappy action over the full length of Cedarapids Horizontal Screens, with no vibration transmitted to the frame, eliminates dead spots and assures faster, more effective separation without carryover.

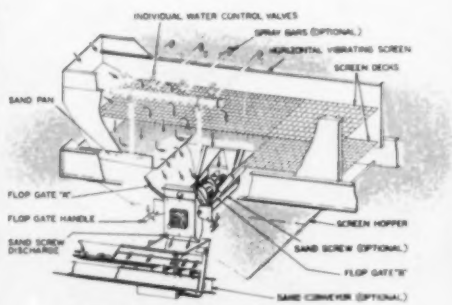
Should screen box be stress relieved? Yes, to insure longer life and lower maintenance. Cedarapids screen boxes and support frames for wire cloth are heat treated in a special furnace to relieve any stress that might be set up in welding.


STRESS RELIEVED
FOR LONG LIFE

What about screening very abrasive material? Let's face it! Wear and maintenance will be relatively high. But in a Canadian plant, processing rock so abrasive that it eats through ¾" mild steel plate in 35 minutes, the producer chose Cedarapids Horizontal Screens with Ioweave screen cloth, after thorough testing of many other makes. Ioweave screen cloth, made by Cedarapids from a special analysis, oil tempered wire that withstands abrasive wear, proved most economical for this tough job.


IOWEAVE SCREEN CLOTH
RESISTS ABRASION AND FATIGUE

When should you use a "special" screen? Always! Your particular job is always "special" because there's no other like it. You need screens with the correct deck arrangements, proper cloth openings, perhaps with washing attachments . . . screens for aglime, rip rap, scalping, or portable screening units . . . whatever is exactly right to handle the special requirements of your job. In the complete Cedarapids line, there are screens, attachments, and accessories in the type and size you need.



SCREENS AND ATTACHMENTS TO
MEET YOUR SPECIFICATIONS

How can you select the best screens for your job? Easy! First, ask your Cedarapids Dealer to help you work out your specification requirements. Then simply send them to Cedarapids for an engineered recommendation for the Cedarapids Horizontal Vibrating Screens that will meet your specifications with lowest cost per ton.

at lowest cost per ton...with

CEDARAPIDS HORIZONTAL VIBRATING SCREENS

Cedarapids' 25-year-proved design of Horizontal Vibrating Screens brings you the profit-benefits that insure high capacities of specification-perfect products at lowest cost per ton. The horizontal position of the screen, plus its snappy live action, permits more material of the correct size to pass through each deck. Crushers are not bogged down by screen carryover. Your entire plant is production-balanced for maximum hourly tonnages.

The extra-high capacity and extremely close gradation of Cedarapids Screens cut down the circulating load, thus reducing wear on crusher jaws, roll shells and conveyors. Lower over-all plant maintenance cuts your cost per ton still further.

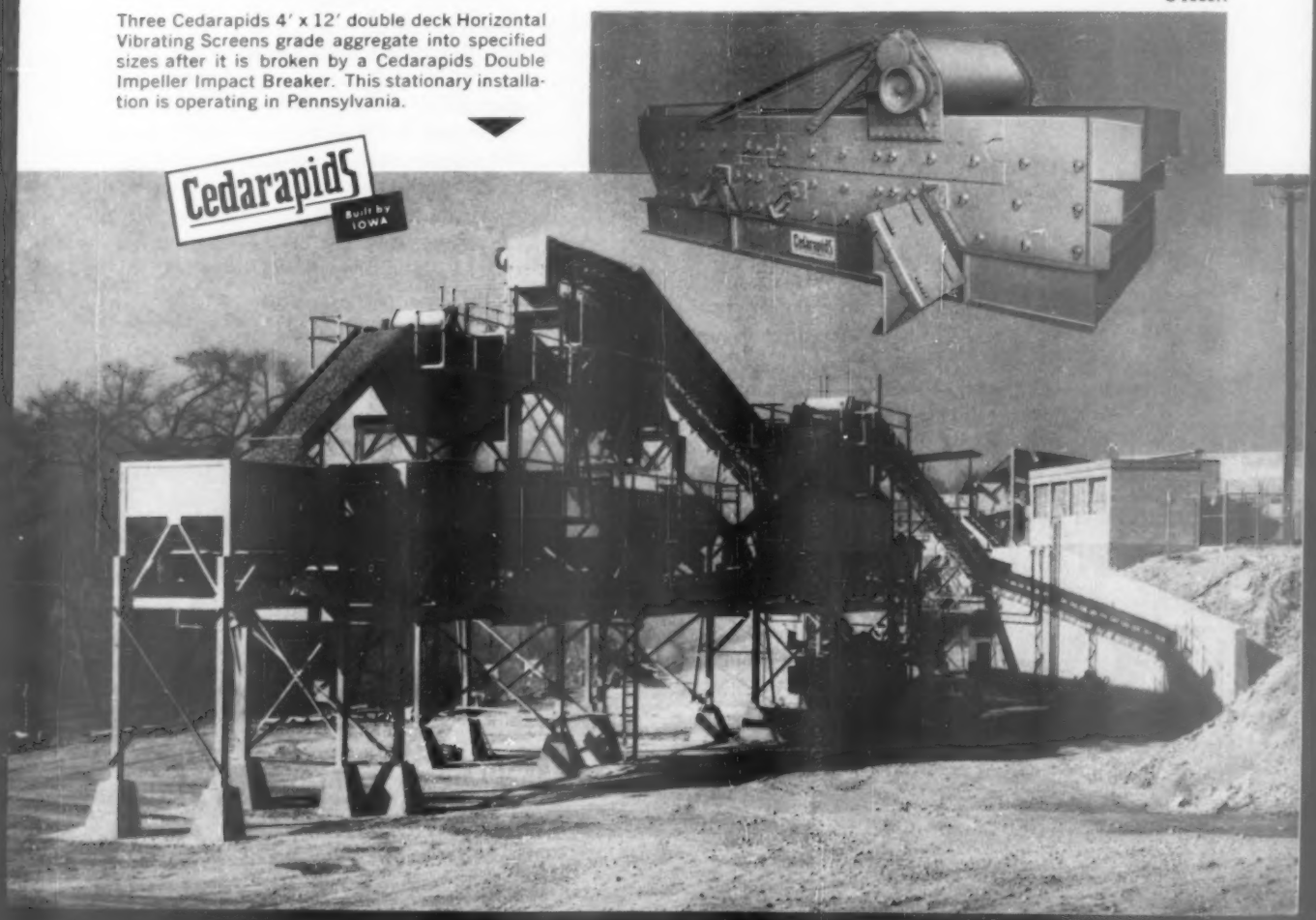
Always specify Cedarapids Horizontal Vibrating Screens for your stationary installations. And to be sure of *most* efficient, *most* profitable operations, call on Cedarapids to engineer your entire plant.

Write for information today!

IOWA MANUFACTURING COMPANY • Cedar Rapids, Iowa

S-1060N

Three Cedarapids 4' x 12' double deck Horizontal Vibrating Screens grade aggregate into specified sizes after it is broken by a Cedarapids Double Impeller Impact Breaker. This stationary installation is operating in Pennsylvania.



1961 truck roundup (continued)

Reo has expanded its truck line with two new series of heavy-duty, over-highway models. These have been specifically engineered for low chassis weight and improved weight distribution.

The D-600 and D-700 series are powered by V-8 gasoline engines. Two single-axle and two tandem-axle tractors are offered, in addition to two tandem truck models. A complete selection of standard and auxiliary optional transmissions is available to meet specific operating conditions. Rear axles are available in capacities from 21,000 to 38,000 lb. with a wide choice of reduction ratios and gearing. (Reo Div., The White Motor Co., Lansing, Mich.)

Enter 203 on Reader Card

For 1961, Mack offers a pair of big trucks especially for the heavy duty encountered in the rock products industry. These units are designated as M-45SX, a 45-ton, 3-axle rig; and M-30X, a 30-ton unit with two axles.

Both models in the new "M" series feature an offset cab to greatly increase the operator's range

of visibility. This cab has a reverse-slope windshield, strong doors and grouped instruments for better control.

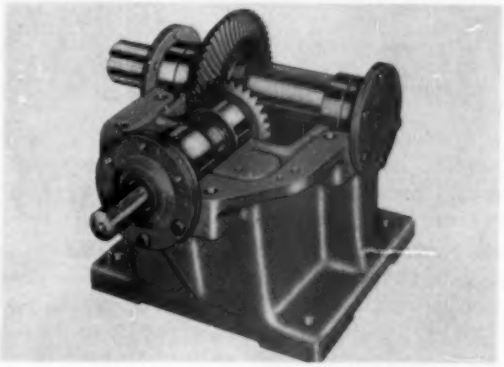
Standard engine for the 45-ton model is a naturally aspirated 450-hp. V-12 diesel engine. Optional engines between 420 and 525 hp. can be installed. A 320-hp. diesel engine is standard on the 30-ton truck with a 380-hp. engine optional. (Mack Trucks, Inc., Plainfield, N.J.)

Enter 204 on Reader Card

Spiral-bevel reducer

The advantages of right-angle drives can be attained with a new line of heavy-duty spiral-bevel reducers. Single, double and triple reduction units are offered, and the efficiency of all units is 95 percent or better. The high-speed gears in all units are helical bevel gears. Helical gears are used for the low-speed sets in the double and triple reduction units.

Single reduction reducers range between 1 to 1 up to 6.20 to 1 reduction with ratings between 85 and 810 hp. Triple reduction units range from 47.1 to 1 up to 357 to 1 ratios, while the double reduc-



tion reducers cover the range between 6.2 to 1 and 47.1 ratios.

All reducers are conservatively rated by AGMA standards. All have high-strength cast iron housings with oversize inspection cover and all units have roller bearings throughout for high overhung load capacity.

For the many applications in the rock products industry where backward movement of conveyors or heavy machinery is undesirable, the new reducers can be fitted with an integral sprag-type backstop. This backstop is enclosed in its own housing with its own reservoir of oil. Selected for each reducer size and ratio, the backstop will withstand reverse torque in excess of the rated output torque. (Hewitt-Robins Inc., 666 Glenbrook Rd., Stamford, Conn.)

Enter 205 on Reader Card

Bag collector

The Model K Aeroturn is a new reverse jet dust filter that assures virtually 100-percent collection efficiency. Its design is exceedingly simple and provides substantial savings in maintenance costs as well as achieving maximum recovery of airborne dust.

Collecting medium is a special blend of wool, Dacron and Orlon felt, developed as the result of several years of testing and research. The felt is cleaned in operation by the action of an automatic pressure control; it operates only when the bags need cleaning. (Koppers Co., Inc., Metal Products Div., 200 Scott St., Baltimore, Md.)

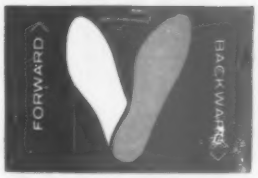
Enter 206 on Reader Card

Please turn to page 146

The ML-157 (shown above) has a 7000-lb. carrying capacity. Lorain also builds the ML-153 with 6000-lb. carrying capacity.

MOTO-LOADER® BALANCED* THREE WAYS FOR FAST CYCLES . . . BIG OUTPUT

1. ***WEIGHT BALANCE.** Lorain puts the center of gravity low, distributes the weight on heavy-duty axles for ground hugging travel without bounce or teeter. The product of true engineered balance, the ML-157 travels with its load at optimum height to save dump time at the truck.
2. ***CONTROL BALANCE** features one-foot travel and speed control for coordinated work flow. Using "no-hands" direction selectors, operator keeps one hand on the wheel at all times, uses other hand for other operations. Finger-tip controls require few motions for easy operation.
3. ***POWER BALANCE.** Engine size, hydraulic capacity and multi-speed, power-shifted transmission provide the right degree of power for positive crowding and digging, smooth travel, fast loading. No wasted horsepower, no wheel spinning. All the power is used for work.



One-foot travel control boosts payloads . . . frees operator's hands for steering, bucket control and other operations. By pivoting his foot between two adjacent pedals, operator controls direction—forward and reverse. Speed is controlled by depressing pedal further.

PLUS ALL THE FEATURES NEEDED FOR BIG PRODUCTION • Power booster steering • Torque converter • "Safety" lift arms • Heavier, one-piece frame • Four-wheel drive • Four-wheel hydraulic brakes • Shock absorbing, planetary wheel hubs • *See your Lorain distributor.*

THE THEW SHOVEL COMPANY, LORAIN, OHIO

LORAIN® ON THE MOVE

PLANTS: In Lorain, Elyria and Bucyrus, Ohio . . . **PRODUCTS:** Power shovels, cranes, draglines, clamshells, and hoes on crawlers from ⅜- to 2½-yard capacity • Cranes from 7 to 80 tons . . . on crawlers, and as rubber-tire Moto-Cranes, and Self-Propelled Cranes • Rubber tire front-end Moto-Loaders in 6000-lb. and 7000-lb. carrying capacity . . . **OUTLETS:** Lorain products sold and serviced by 249 distributor outlets throughout the world.

Enter 1289 on Reader Card

continued from page 144

Aggregate loader

Aggregates producers can now weigh and load materials quickly and accurately with the new Auto Agg-Weigher. Automatic controls assure that each truck or batch receives an exact weight of sand, gravel or crushed stone. Once set, the truck driver or operator starts the machinery with a push button. This eliminates a separate weighing operation, guesswork, visual control and the loss of revenue from short-shipments. (Chain Belt Co., Milwaukee 1, Wis.)

Enter 207 on Reader Card

Fuse end

Blasting cords can be protected from moisture with the use of a new plastic fuse end. It is recommended for sealing fuse ends in the charges in the bottom of wet holes. Watertightness can be secured simply by pushing the plastic enclosure firmly over the end of the cord. (Austin Powder Co., 458 Rockefeller Bldg., Cleveland 13, Ohio)

Enter 208 on Reader Card

Vibrating feeders

High-capacity feeders can now be installed in low headroom. This achievement is the result of a new principle of vibration that produces a high intensity motion in the feeder plate.

Two unbalanced shafts rotate in opposite direction to produce vibration. Each shaft is driven with a compact, pancake motor and the rate of feed can be controlled by changing the amount of shaft unbalance.

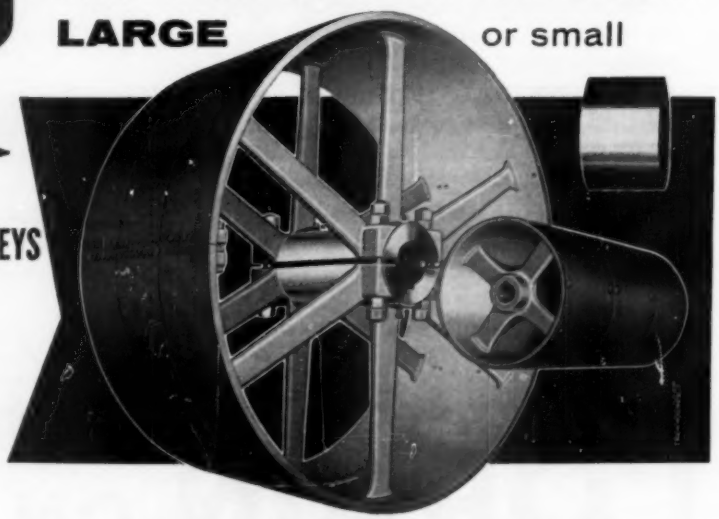
Capacities are offered up to 1,350 tph. for materials common in the rock products industry—slag, shale, crushed stone, sand and gravel. Each feeder is shipped as a complete unit ready to install, thus eliminating field assembly. (Link-Belt Co., Prudential Plaza, Chicago 1, Ill.)

Enter 209 on Reader Card

Please turn to page 149

PULLEYS THAT PERFORM ON THE JOB...

LARGE or small



EHRSAM

MICROMETAL CAST-IRON PULLEYS

There is no substitute for experience in producing cast-iron pulleys for use in our many modern industries. Today, after 88 years of experience, the Ehrsam Company is still continuing research to produce quality cast-iron pulleys.

Whether you use small pulleys or large pulleys, totally split pulleys, corrosive surface or wearing surface, you can be sure of quality gray cast-iron plus service when you specify Ehrsam Micrometal pulleys.

In quality cast-iron pulleys, experience counts and this is what Ehrsam is noted for. Call the J. B. Ehrsam and Sons Manufacturing Company and discuss your needs for standard or special pulleys.

THE J. B. EHRSAM & SONS MFG. CO.

ENTERPRISE • KANSAS

BRANCH OFFICES: ATLANTA, GEORGIA; CHICAGO, ILLINOIS; DENVER, COLORADO; DES MOINES, IOWA; FORT WORTH, TEXAS; HASTINGS, NEBRASKA; KANSAS CITY, KANSAS; PHOENIX, ARIZONA; SAN FRANCISCO, CALIFORNIA.

SALES REPRESENTATIVES: THOMER EQUIPMENT CO. • MINNEAPOLIS, MINNESOTA

Enter 1219 on Reader Card

SAVING 6½¢ PER MILE–

$52,300 per year for a 40-truck fleet

SAVED: $1,075 per year per truck in repairs and replacements of drive-line and chassis components, engine and transmission repairs, universal joints and axles . . .

SAVED: $190 per year per truck in engine-disconnect clutch replacements and adjustments . . .

SAVED: $122.50 per year per truck in brake relining costs; $67.50 per year per truck in engine lugging damage . . .

It adds up to a saving of $1,455 per year per truck since Arizona Sand & Rock of Phoenix switched from stick shifts to ReoMatic *Fully* Automatic Transmissions.

Subtract automatic transmission repairs and maintenance —$147.50 per year per unit—and you get a net saving of $1,307.50 per truck, 6½¢ a mile on 20,000 miles a year.

And, as ASR equipment superintendent Ralph Greer says, "Multiply that times 40 units we have in our fleet and you get an annual saving of $52,300 due to automatic transmissions alone."

What's more, the automatics deliver 6 mpg. compared to 5 mpg. for the stick-shifts . . . save 15 minutes on a 15-mile run . . . help ASR give better service to its customers with its fleet of dumps and mixers. No wonder ASR is standardizing on the automatics.

You, too, can save big money in your trucking operations if you get a *fully* automatic transmission in your next truck. For details see your truck dealer or write Allison Division of General Motors, Indianapolis 6, Indiana.

Allison

FULLY AUTOMATIC TRUCK TRANSMISSIONS

Now available in

CHEVROLET — POWERMATIC

DIAMOND T — ALLISON AUTOMATIC

DODGE — TORQMATIC

FORD — TRANSMATIC

REO — REOMATIC

Enter 1253 on Reader Card

Firestone's Giant Tire Service keeps the wheels rolling..

FIRESTONE OFF-THE-HIGHWAY TIRE SERVICE IS AS NEAR AS YOUR PHONE!

Alabama, Birmingham	FA 2-4411
Alaska (Call Seattle, Washington)	MA 3-5474
Arizona, Phoenix	AL 2-2365
California, Los Angeles	RA 3-6751
Sacramento	GI 2-0445
San Francisco	YU 6-4950
Southern Calif.	RA 3-6751
Colorado, Denver	AC 2-8678
Connecticut, Hartford	BU 9-1551
Florida, Jacksonville	EL 4-1414
Miami	OX 1-0880
Georgia, Atlanta	CE 7-1531
Hawaii, Honolulu	6-3641
Illinois, Chicago	WA 2-1515
Peoria	637-7721
Indiana, Indianapolis	ME 7-5461
Iowa, Des Moines	AM 5-8395
Kansas, Kansas City	HA 1-5542
Wichita	LY 1-3405
Louisiana, New Orleans	JA 5-9227
Maryland, Baltimore	PL 2-3500
Massachusetts, Boston	AV 2-0010
Michigan, Detroit	WO 3-1060
Grand Rapids	GL 1-2911
Minnesota, Minneapolis	ST 9-2466
Missouri, St. Louis	PE 1-6880
Nebraska, Omaha	733-4114
New Jersey, Newark	MA 2-6250
New York, Albany	HE 6-0701
Buffalo	TX 6-8803
New York	PL 7-6200
Syracuse	GR 5-9904
North Carolina, Charlotte	EX 9-5691
North Dakota, Fargo	AD 5-6448
Ohio, Akron	JE 5-4925
Cincinnati	PA 1-6816
Cleveland	BE 4-2012
Columbus	AM 7-6333
Oklahoma, Oklahoma City	JA 5-9481
Oregon, Portland	MO 5-8181
Pennsylvania, Harrisburg	CE 8-7244
Philadelphia	SA 7-2600
Pittsburgh	MO 1-2100
Tennessee, Memphis	WH 8-4443
Nashville	CY 1-4122
Texas, Dallas	FL 1-9901
Houston	WA 3-7636
San Antonio	CA 7-7375
Utah, Salt Lake City	EM 4-5626
Virginia, Richmond	BE 3-8841
Washington, Seattle	MA 3-5474
Wisconsin, Milwaukee	SH 4-9060

Enter 1243 on Reader Card

NIGHT & DAY

Super Rock Grip Wide Base* Super Rock Grip Deep Tread*

TUBELESS OR TUBED

You know how expensive tire downtime can be! The answer: keep it short. And with a Firestone Tire Expert on your project, it *will* be short. He'll do the worrying for you. He'll keep the correct pressure in the tires for every condition. Many times, he'll put the finger on trouble before it happens. But if trouble happens fast, he'll fix it fast. He can match new tires to any job, any rig—tires built with Firestone Rubber-X, the longest-lasting rubber ever used in Firestone tires plus the extra strength of Shock-Fortified nylon cord. So let Firestone take some of the risk out of those low bid jobs. Firestone Giant Tire Service is one of the best hedges against deadline pressure.

*Firestone T.M.

Firestone

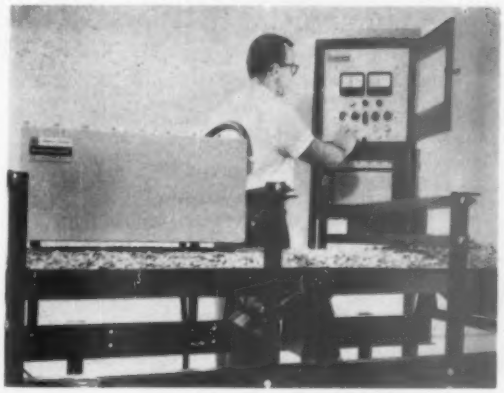
BETTER RUBBER FROM START TO FINISH

Copyright 1960, The Firestone Tire & Rubber Company

Tune in Eyewitness to History every Friday evening, CBS Television Network.

NEW MACHINERY

continued from page 146



Nuclear gauges

A line of four new instruments brings process control in many segments of the rock products industry one step closer. These nuclear gauges monitor four basic properties of materials in process: (1) bulk density of granular solids, (2) percentage of moisture in granular solids, (3) specific gravity or density of pumpable slurries and (4) percentage moisture in slurries.

Each instrument consists of three parts: a measuring head, an electronic readout and an instrument to display the information needed and to record or control it.

Nuclear techniques provide the basis for each gauge. Density measurements use gamma ray reflection or transmission; the source of radiation is either cesium 137 or radium 226. Moisture measurements are made with neutron reflection from fast neutron sources determined by the application. Whatever the source of radiation, it is carefully shielded and completely safe. (Nuclear-Chicago Corp., 359 Howard Ave., Des Plaines, Ill.)

Enter 210 on Reader Card

Loader-tractor-backhoe

A new-type loader and backhoe is uniquely designed as a completely integrated unit. According to the maker, this differs from conventional tractors to which loader buckets and backhoes have been attached. This results in unusually good visibility for both loader and backhoe use.

Outstanding features of the Dynahoe include a heavy frame, bucket, boom dipper and other parts, power shift transmission, torque converter, power steering, planetary rear axle and heat exchangers for the hydraulic system. Capacity of the loader is ⅞ cu. yd. struck and 7½ cu. ft. on the backhoe. (The Hy-Dynamic Co., Lake Bluff, Ill.)

Enter 211 on Reader Card

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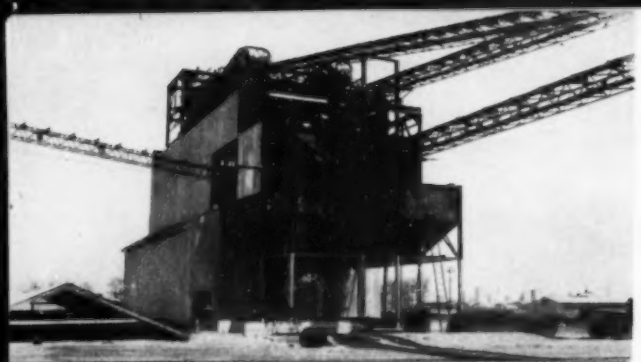
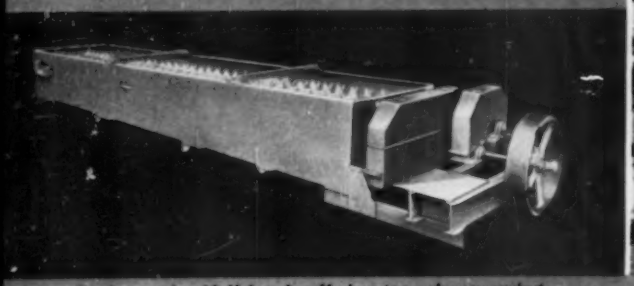


In Standard Materials Corporation's Maywood (Indianapolis) plant, two 10" x 30' McLanahan Log Washers.

In the Plainfield, Indiana plant, a 10" x 25' Log Washer.

In the Clinton, Indiana plant, a 10" x 25' Log Washer.



Fundamentals with McLanahan Mudmasters—cleaner product, profitable tonnages, up to 40% lower power requirements, compared with other types of washers.

Selected by STANDARD MATERIALS not once but 11 times

This progressive Indiana and Kentucky operator selected eleven McLanahan Log Washers for installation in seven gravel plants. *May we send Technical Bulletin MM-90 on Mudmaster Log Washers?*

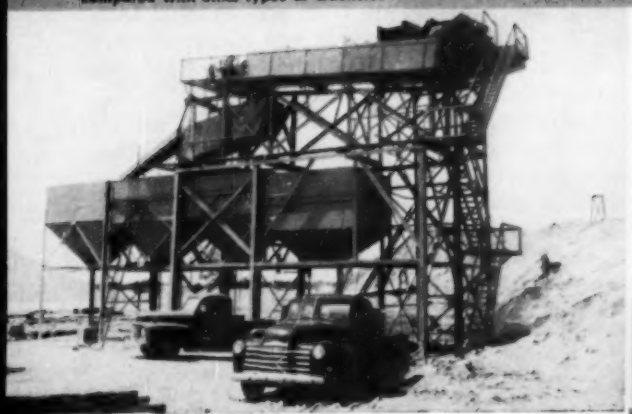
McLANAHAN SINCE 1835

LOG WASHERS

McLANAHAN AND STONE CORPORATION
HOLLIDAYSBURG, PENNSYLVANIA

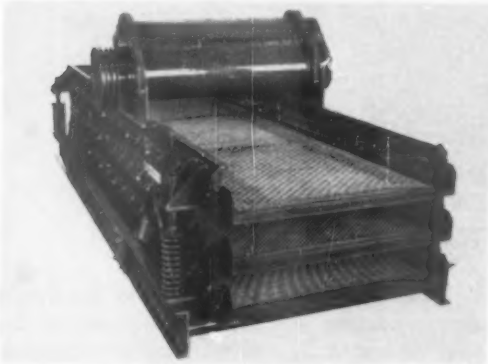
In the Milton, Kentucky plant, a 10"x30' McLanahan Log Washer.

At Burlington, Kentucky, a 10" x 30' and a 10" x 25' Log Washer.



In Standard Materials' 86th Street (Indianapolis) plant, a 10" x 25' McLanahan Log Washer.

In the Speedway (Indianapolis) plant, a 10" x 30' and two 10" x 25' Logs.



Vibrating screen

This newly designed vibrating screen line is particularly useful to the aggregate producer where lack of headroom is a limiting factor. At the same time, the new screens' decks have the structural strength to handle large volumes of heavy gravel and crushed stone.

The Model OA-95 is a horizontal, triple-deck screen that is available in sizes from 4 x 10 ft. to 4 x 16 ft. One-piece side members are of all-welded stress-relieved construction. The vibrating mechanism is made up of a pair of counter-rotating alloy steel shafts mounted in heavy-duty precision bearings. Any of the screens can be quickly converted to two-deck operation simply by removing the middle screen cloth. (Simplicity Engr. Co., Durand, Mich.)

Enter 212 on Reader Card

Dry flow meter

Free-flowing dry solids can now be accurately weighed and measured using a device named the IPI Dry-Flow Meter. It provides a low cost approach to automation of bulk solids processing by providing instantaneous and continuous data. Accuracy is said to be within a range of plus or minus 1 percent for most dry solids.

The new meter operates by translating stream flow into an electric current, using a new type of electronic transducer. Instruments interpret the electric signals and register or record them as weight per unit of time, total weight in a time interval or other process information that can be derived. The signals can be linked into feeders or other controls. (Industrial Processes, Inc., 621 S.W. Morrison St., Portland 5, Oregon)

Enter 213 on Reader Card

Please turn to page 152

RP BUYER RESEARCH SERVICE
PRODUCER PURCHASING SERVICE *FREE*

QUICK—COMPLETE SOURCE CONTACTS FOR ROCK PRODUCTS PRODUCERS on Machinery—Equipment—Supplies—Service

___Aftercoolers, Air
___Agitators
___Aggregates (special)
___Air Compressors
___Asphalt Mixing Plants
___Bagging Machines
___Bags
___Barges
___Belting, Conveyor
___Belting, V-type
___Belt Repair Equipment
___Bin Level Indicators
___Bins and Batching Equipment
___Bits
___Blasting Supplies
___Bodies, Trailer
___Buckets
___Bulldozers
___Cars, Industrial
___Classifiers
___Clutches
___Coal Pulverizing Equipment
___Concentrating Tables
___Conveyors
___Crushers
___Coolers
___Cranes
___Derricks
___Dewatering Equipment, Sand
___Diesel Engines
___Dragline Cableway Excavators
___Draglines
___Dredge Pumps
___Drilling Accessories
___Drills
___Dryers
___Dump Bodies
___Dust Collecting Equipment & Supplies
___Electric Motors
___Engineering Service Consulting and Designing
___Explosives & Dynamite
___Fans and Blowers
___Feeders
___Fifth Wheel Heavy Duty Special
___Flotation Equipment
___Front End Loaders
___Gasoline Engines
___Gear Reducers
___Generator Sets
___Grinding Media
___Gypsum Plant Machinery
___Hard Surfacing Materials
___Hoists
___Hoppers
___Kilns: Rotary, Shaft, Vertical
___Locomotives
___Lubricants
___Magnetic Separators
___Mills
___Pipe
___Pumps
___Scales
___Screen Cloth
___Screens
___Scrubbers: Crushed Stone, Gravel
___Shovels, Power
___Speed Reducers
___Tanks, Storage
___Tires and Tubes
___Torque Convertors
___Tractor Shovels
___Tractors
___Trailer Dump Bodies
___Trucks, Bulk Cement
___Trucks, Industrial
___Trucks, Mixer Body
___Trucks, Motor
___Valves
___Vibrators
___Welding and Cutting Equipment
___Winches
___Wire Cloth
___Wire Rope

If equipment you are in market for is not listed above, write it in space below.

The principal rock product(s) manufactured by my company is/are indicated "1", "2", "3", in order of importance below.
___Crushed Stone
___Sand & Gravel
___Slag
___Cement
___Lime
___Gypsum
___Ready Mix Concrete
___Concrete Products Type_____
Other nonmetallic mineral (What?)_____
All above information is strictly confidential to be used to guide the manufacturers in supplying proper information.

Please Check Service Desired
☐ Have Salesman Call ☐ Literature only
☐ Prices ☐ By mail ☐ Urgent

NOTE: See—Where to Buy-Classified Advertising Section for used equipment and complete plant information

Name _____
Title _____
Firm _____
Street & No. _____
City and State _____
Your Signature _____ Title_____

FILL IN—TEAR OUT—MAIL NOW! *BUYER RESEARCH SERVICE DEPARTMENT:* ROCK PRODUCTS 79 W. Monroe St. Chicago 3, Illinois

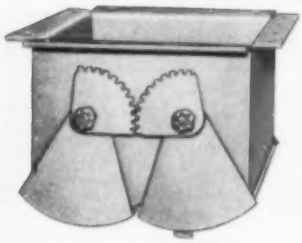
TOUGH
CONVEYING and ELEVATING CONDITIONS ?

STANDARD METAL'S users lick TOUGH problems Every Day!

STANDARD METAL'S CONTINUOUS ELEVATOR BUCKET STYLE No. 2

This long-life bucket resists wear —delivers outstanding service and economy under severest conditions. This style is just one of the complete line of low-cost, rugged steel buckets manufactured by Standard Metal. Available in Salem, Style "A" and other continuous style buckets.

STANDARD METAL'S BIN GATES

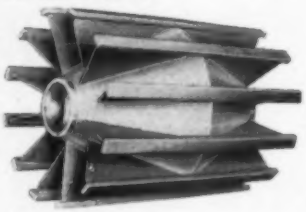


Here's the all-steel, gear-operated Duplex Bin Gate for faster, easier material handling at minimum cost. Now supplied standard with twin bracket at bottom of gate, drilled to accommodate bolt for fulcrum lever.

Single Bin Gates by Standard Metal also available.

STANDARD METAL'S WING-TYPE SELF-CLEANING PULLEY

Includes Taper-Lock Split Bushing to save time and trouble when mounting shaft. These pulleys are light in weight, yet their all-steel welded construction resists breaking, and delivers many years of trouble-free, low-cost service. Also available with solid hubs bored to specifications.



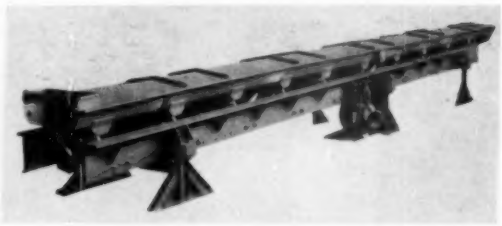
Contact us for full details and quotations on your particular needs in elevating and conveying equipment—for new installations or replacements. Ask for the catalog showing the complete Standard line.

The Standard Metal Mfg. Co. SINCE 1921

STANDARD METAL MFG. CO.
111 CENTER ST. MALINTA, OHIO

Enter 1245 on Reader Card

continued from page 151



Vibrating conveyors

Gentle conveying action of friable materials without degradation of material is promised by the maker of a new line of mechanical vibrating conveyors. These dynamically-balanced units with a reactive type of drive mechanism are known as TMV—Twin Mass Mechanical Vibrating conveyors.

The new conveyors are offered in a range of widths from 12 to 48 in., and in lengths up to 30 ft. Capacities will depend on the material to be handled but will range up to 200 tph. Conveying action can be adjusted to suit the material handling characteristics of each material simply by adjusting the amplitude of the drive stroke. Covered troughs can be supplied for hot or dusty materials, and trough designs can be specified to do drying or cooling.

Mounting is said to be easy since the rigid supporting framework does not transmit vibration to the foundation. (The Jeffrey Mfg. Co., Columbus 16, Ohio)

Enter 214 on Reader Card

New cage crusher

A newly designed crusher is said to reduce the power requirement for crushing as much as 40 percent. Size of the finished product may be closely controlled by regulating the operating speed of the single moving element of the crusher. Only three sizes of the crusher cover the entire range of capacity between 10 and 250 tph.

Crushing is accomplished by a cast manganese steel rotor as it hurls the incoming feed against fixed manganese steel liner plates. Sized aggregates drop through the discharge opening while the oversize remains in contact with the crushing.

Maintenance apparently requires very little downtime. The rotor and breaker plates can be readily exposed for inspection by removing the feed side plate. Breaker plates can be reversed, interchanged or removed within a matter of minutes. (The Frog, Switch & Mfg. Co., P.O. Box 431, Carlisle, Pa.)

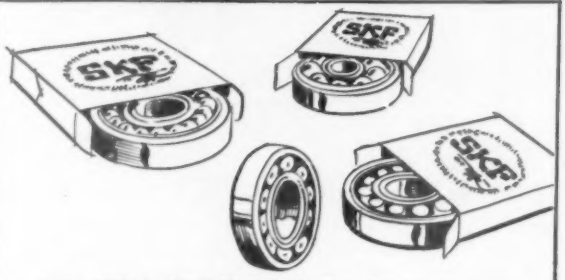
Enter 215 on Reader Card

Please turn to page 154

DISTRIBUTOR DAN, the SKF bearing man, shows

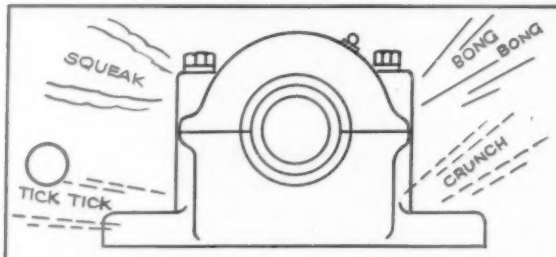
HOW TO CHECK BEARINGS DURING RUN-IN

—to prevent damage and downtime later!



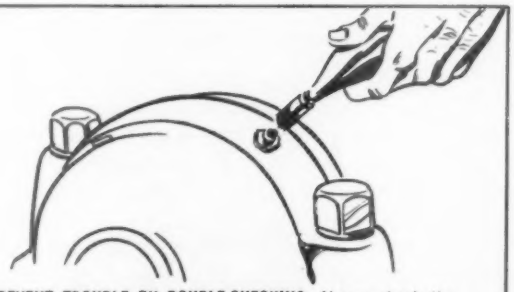
THINK BEFORE YOU INSTALL THEM. The first few hours of operation are the most critical in a bearing's life. So, operate the bearing at reduced speed and load during run-in. Bearing run-in periods vary from a few hours to a few weeks, but 24 hours is usually sufficient.

NOISE CAN BE A SYMPTOM. A soft, purring sound is all you should hear from a bearing—if it's operating correctly. Check by placing the blade of a screwdriver and listening at the handle. Any other noise means trouble sooner or later.



KNOW YOUR NOISES. Squeaking means inadequate lubrication. Metallic tones indicate shaft or housing interference or improper adjustment. Smooth, clear tones tell of marks in the stationary raceway. Intermittent noises indicate a damaged ball. Crunching means dirt.

TOO HOT TO HANDLE? There's trouble brewing if the housing feels excessively hot. High temperature usually indicates overlubrication or use of a lubricant with too high viscosity. It can also be a sign of excessive axial or radial preloading, misalignment, tight-fitting seals, or rubbing.



PREVENT TROUBLE BY DOUBLE-CHECKING. Always check the bearing after the critical run-in period. Examine the lubricant. If it's dirty, change it. Check the seals for signs of wear or damage. A few minutes spent double-checking now eliminates chances of costly damage and downtime later.

Baffled by a bearing problem? Whether it's selection, mounting or maintenance—consult your Authorized SKF Distributor. He's staffed to help you keep them running smoothly and he stocks all the bearing types and sizes you need.

Spherical, Cylindrical, Ball, Torpon® Tapered and REED Miniature Bearings

EVERY TYPE—EVERY USE

SKF®

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

® REG. U. S. PAT. OFF.

Enter 1285 on Reader Card

LIME . . . CEMENT KILNS

VULCAN OF WILKES BARRE CAN DESIGN & MANUFACTURE JUST THE TYPE YOU NEED

All equipment made by Vulcan must measure up to the standard of quality and responsibility it has taken 111 years to earn. Contact Vulcan today . . . estimates, constructive suggestions and preliminary drawings will be furnished (as far as possible) without obligation.

VULCAN IRON WORKS INC.

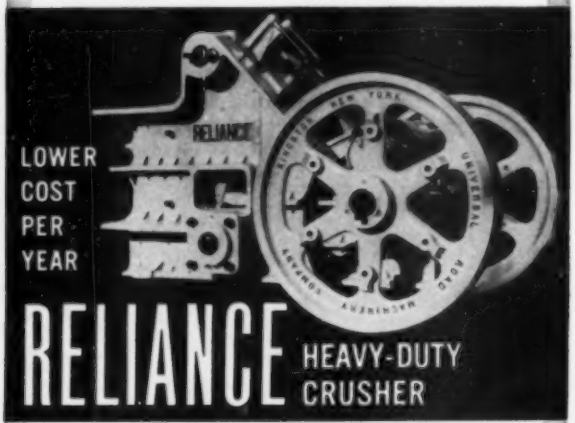
Wilkes-Barre, Pa. Cable Address: Vulworks

"The Oldest Name In Rotary Kilns."

Enter 1246 on Reader Card

LEVER-TYPE JAW CRUSHER STILL IN USE AFTER 36 YEARS

—at Keystone, So. Dakota



- Heavier, stable—you save money on upkeep.
- Minimum abrasion — outlasts other designs 3 to 1.
- Long jaw plates — adjustable for fineness.
- Crushing, screening and washing plants—50 to 1,500 tons-per-day capacity—engineered to your needs.

Booklet on request, pictures installations.

UNIVERSAL ROAD MACHINERY CO.

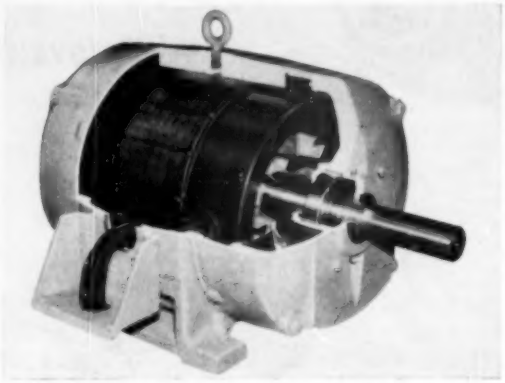
Main office and factory: Kingston, N. Y.

New York City office: 117 Liberty St.

Enter 1247 on Reader Card

NEW MACHINERY

continued from page 152



Sealed "open" motors

A new line of epoxy-protected squirrel cage motors offers the economy and overload protection of open type with the winding protection of an enclosed-rated electric motor. These new motors are said to be ideal for applications typical of conditions in the rock products industry—shock, vibration, excessive moisture, abrasive fines and weather exposure.

All standard horsepowers are available between 1 and 125 hp. in 2 or 3-phase windings for all standard cycle and voltage ac. current. Enclosure ratings for NEMA designs A, B, C and D are offered in 1, 2, 3 and 4-speed constant or variable torque applications. (Howell Electric Motors Co., 16316 W. 7 Mile Rd., Detroit 35, Mich.)

Enter 216 on Reader Card

Roller rebuilding machines

Two new machines make it economical for the rock products producer to rebuild and to flame harden track rollers in his own shop.

The Model B is a low-cost machine for automatically rebuilding these parts. It is ideal when economy and low capacity are needed, for it works on only two rollers or idlers at a time. With a ¼-ton crane, the operator can position the rollers while central controls let the operator regulate the operation.

A flame-hardening machine permits rollers to be hardened to 50 Rockwell C, two at a time. In this way the rebuilt rollers or idlers can be restored to a hardness that prevents premature failure. Dual torches on this machine flame harden both inside and outside of each roller simultaneously to prevent distortion. (Victor Equipment Co., 844 Folsom St., San Francisco 7, Calif.)

Enter 217 on Reader Card

Please turn to page 156

SERIES 5000
For intermittent operation . . . relatively low capacity.

SERIES 6000
For continuous operation . . . moderate capacity.

759 ways to solve your idler problems

Link-Belt idlers in standard types and sizes to meet every conceivable belt conveyor need

You're sure to find the exact idler to perfectly match your belt conveyor requirements from the complete Link-Belt line of 759 types and sizes.

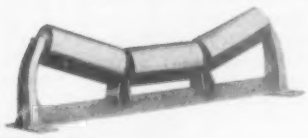
This broad line enables you to select a size idler that exactly matches your needs, no over- or under-engineering. Power requirements are held to a minimum. In addition, anti-friction bearings, accurate roll alignment and rugged construction provide maximum life for idlers and conveyor belt in light- or heavy-duty service.

Link-Belt idlers are available with end rolls inclined at 20°, 35° and 45° for a broad range of belt widths. Matching lines of troughed belt rubber cushion, troughed belt training, return belt and rubber tread return belt idlers are also available. Call your nearest Link-Belt office or authorized stock-carrying distributor for full details. Look for CONVEYORS in the yellow pages of your phone book. Or write for Book 2716.

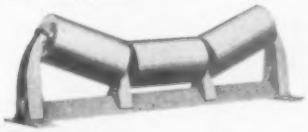
LINK-BELT

BELT CONVEYOR IDLERS

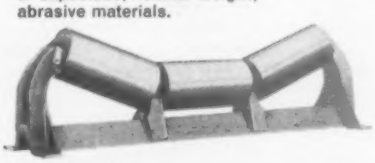
LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15.407



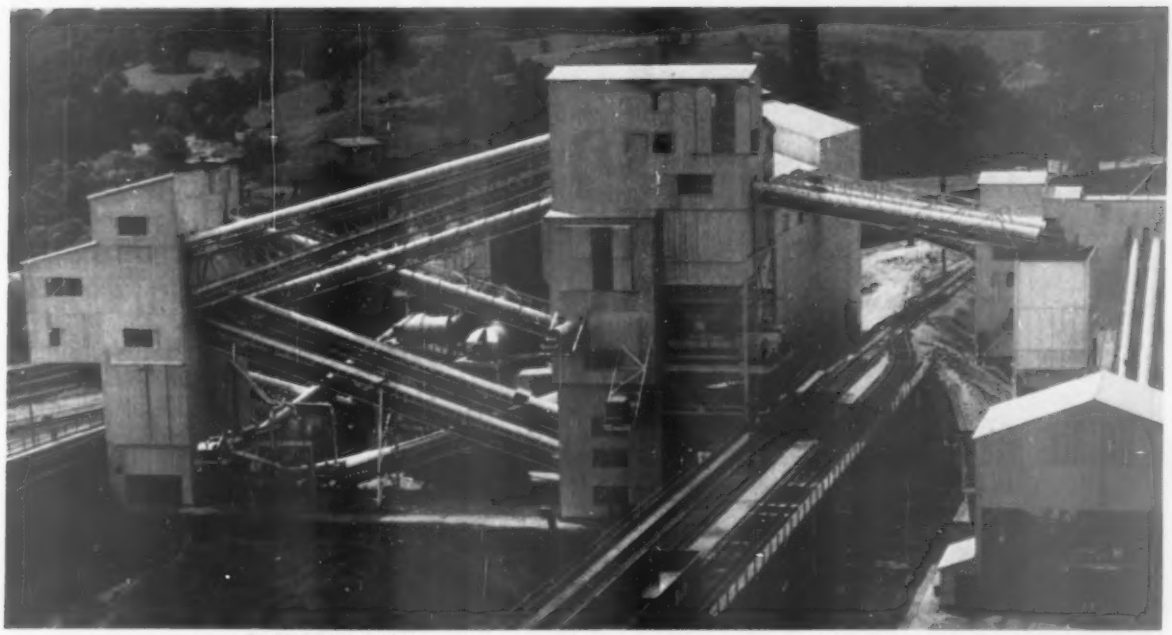
SERIES 7000
For continuous operation, higher capacities, heavyweight, abrasive materials.



SERIES 8000
For continuous operation, higher capacities, heavier-weight, abrasive materials.



SERIES 9000
For continuous service, highest capacities, heaviest and coarsest materials.



50 BELT CONVEYORS, employing five different sizes of various type idlers, keep raw materials moving steadily through this sintering plant of Armco Steel.

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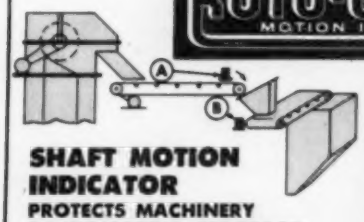
ROTO-GUARD
MOTION INDICATOR



SHAFT MOTION INDICATOR
PROTECTS MACHINERY BY INDICATING STOPPAGE DUE TO OVERLOADING OR MALFUNCTION

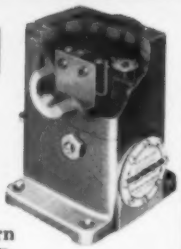
A and B: On end return idlers, warn if conveyor should break, slow or stop.

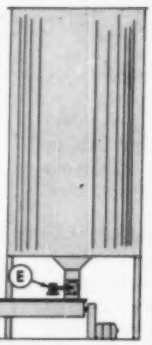
C: On boot pulley, signals slowdown, stoppage, slippage due to overload, boot pulley out of adjustment. Helps prevent fires.

D: On screw conveyor, warns of slowdown due to overloading. Prevents damage.

E: On rotary feeder, warns of slowdown; prevents plugging damage.

Roto-Guards can be wired into interlock system; stoppage of one component automatically stops others; prevents damage.





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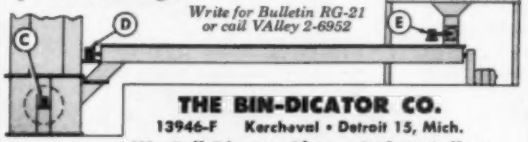

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We Sell Direct • Phone Orders Collect

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THAT MAKES FOR
EXTRA PROFITS

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ROCK PRODUCTS
79 West Monroe Street, Chicago 3, Illinois

NEW MACHINERY

continued from page 154

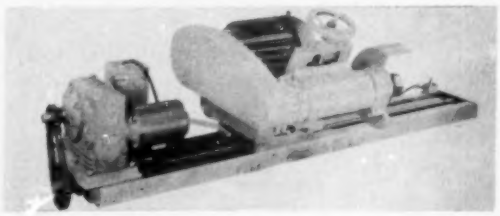
Ball bearing pillow blocks

High-quality ball bearings have been mounted in sturdy pressed steel housings to provide an economical pillow block. The PBS line is offered for the large number of applications where heavy-duty housings are not needed. These include the moderate speed, moderate radial load and low thrust loads encountered in fans, flat roll idler shafts, small conveyors and small machines.

Bearing quality is not sacrified for the low-rated loads. Standard ball bearings with rubber contact seals and self-locking collars assure satisfactory service under a wide range of operating conditions. (The Fafnir Bearing Co., 37 Booth St., New Britain, Conn.)

Enter 218 on Reader Card

Trunnion roll grinder



Trunnion rolls supporting rotary kilns making cement, lime or lightweight aggregates can now be dressed in place. A new grinder fits on a bracket in front or behind the roll which is then ground on its own axis. This mechanism saves the time and expense of dismantling heavy trunnion roll assemblies and avoids extensive production losses.

A 12-in. grinding wheel is driven with a 5-hp. TEFC motor. The grinding assembly is mounted on slide rails and it is moved into position against the trunnion roll with a power-operated traverse. (The U. S. Electrical Tool Co., Llewellyn St., Cincinnati 19, Ohio)

Enter 219 on Reader Card

Please turn to page 158

"Our SECO SCREEN has given us

8 years without losing a minute!"

Elmira Transit Mix, Inc. boosts T. P. H. 60%

Here's more on-the-job proof of the Big Switch to SECO Screens. Says Mr. Bernd, "Our planned production schedule was increased from 75 T.P.H. to an actual average of 120 T.P.H. . . . and in 8 years our only downtime was charged to simple wire cloth changes. This is operation and profit volume that we like. When we're ready to replace or add . . . believe me, SECO will get the nod." Have SECO VIBRATING SCREENS set the pace for long-term profits in your operation . . . next time you're considering ordering screens check out SECO first!

Send for 4-Bearing Catalog #204
and Twin Bearing Booklet TB-21

SCREEN EQUIPMENT CO., INC.
Buffalo 25, N. Y.

SECO
"TIME CONSCIOUS"
VIBRATING SCREENS

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PLATEGRIP
PLATE FASTENERS FOR CONVEYOR BELTS

Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of from ¼" to 1½" thickness. Write for Catalog Sheet.

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HEATED SCREEN
Attachments
Eliminate Cloth Blinding
On all types of Vibrating Screens
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Slurries...handled at lower cost

The new WILFLEY MODEL K Centrifugal Sand Pump embodies important mechanical improvements especially adapted to the handling of cement slurry and results in stepped-up production and substantial power savings. Individual engineering. Write for details.

Buy WILFLEY for Cost-Saving Performance

A. R. WILFLEY and SONS, Inc.
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WILFLEY centrifugal PUMPS

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DURABLE
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WOVENWIRE
SCREENS
KNOWN AROUND THE WORLD
TWIN CITY IRON & WIRE CO.
35 W. WATER STREET · ST. PAUL 7, MINNESOTA

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NEW MACHINERY

continued from page 156

Self-propelled welder

Welding jobs at widely separated locations can now be done quickly and easily with a new self-propelled, self-contained welding unit. There is no need to hook up power lines since the equipment is ready to go to work just as soon as it arrives at the job.

A 400-amp. model is powered with a 6-cylinder engine, the 600-amp. with a V-8 industrial engine. Welding, power and traveling controls are on a dashboard at the driver's seat.

In addition to welding power, the Weldmobile can supply 1,000 w. at 110 v. dc. for auxiliary power. It is equipped for gas welding or cutting and has 2,000-lb. draw-bar pull to push or tow heavy equipment. (Hobart Bros. Co., Troy, Ohio)

Enter 220 on Reader Card

Flexible coupling

Here's a flexible coupling that permits connected machinery to be disconnected or lifted clear without disturbing the power-transmitting elements of the coupling. A removable jaw ring can be moved enough to provide clearance for independent rotation of either end of the coupling. This is advantageous when stationary engines must be temporarily disconnected from the driven elements.

Lubrication is never needed on the new coupling since there is no metal to metal contact. Power is transmitted through cushion blocks inserted in metal jaws.

Standard-duty couplings are designated as type CQ, and the heavy- duty as HQ. The first are rated from 2½ to 156 hp. at 100 rpm. and are available for shafts between 1⅜ and 5½ in. The heavy-duty units are available for shafts between 1¾ and 8½ in. and ratings from 7.77 to 810 hp. at 100 rpm. (Lovejoy Flexible Coupling Co., 4938 W. Lake St., Chicago 44, Ill.)

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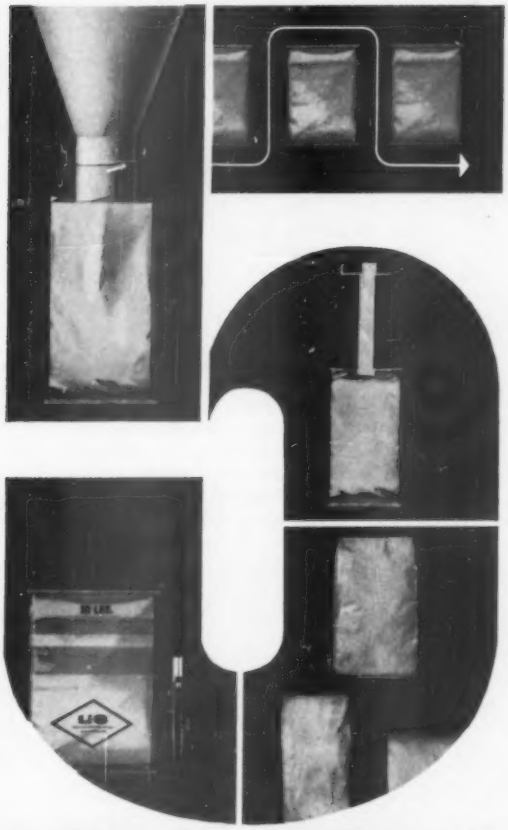
END

every year hundreds of multiwall users reduce total packaging costs thru UNION-CAMP'S



STAR PLAN

...and this comprehensive packaging service is free!

Whether you use multiwall bags by the thousands or hundreds of thousands, UNION-CAMP's Packaging Efficiency Plan offers you impressive cost reductions. And in 5 different ways!

One is a *plant survey*—a professional analysis of your complete packaging and materials handling operation. Another is *bag construction*—improvements in structural design that can often result in substantially reduced basis weight or less breakage. A third is *bag design*. Last year over 125 firms received greater merchandising impact from their multiwalls through this one service alone!

Fourth is *specifications control*. This covers standardization of multiwall bag styles, elimination of unnecessary odd sizes and the freeing of valuable warehouse space.

And finally, *packaging machinery*. By following recommendations made by UNION-CAMP engineers, dozens of companies have speeded their bagging and handling rates...saved thousands of dollars in lowered labor costs.

The 5-Star Plan is free. And it's available to you regardless of the brand of multiwalls you now use.

How much could it save you?

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MULTIWALL BAGS

Union Bag-Camp Paper Corporation · 233 Broadway N.Y. 7, N.Y.

★ BAG DESIGN · BAG CONSTRUCTION · SPECIFICATIONS CONTROL · PACKAGING MACHINERY · PLANT SURVEY

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MANUFACTURERS NEWS

Offut app't. VP of Green Fire Brick Co.

MR. WILLIAM S. LOWE, president of the A. P. Green Fire Brick Co., has announced the appointment of J. James Offutt (photo) as vice president and general manager of the company. In his new capacity, Mr. Offutt will be responsible for the direction of all manufacturing, sales, research and engineering of the organization. Mr. M. D. McClain, assistant vice president of the company, has been appointed assistant to the general manager. Mr. Lowe also announced the appointment of Jack W. Swatek as director of sales, and of H. L. Benyon as general sales manager.

Laegeler app't. VP Frank G. Hough Co.

MR. G. A. GILBERTSON, president of The Frank G. Hough Co., Libertyville, Ill., has announced the appointment of Jules C. Laegeler as vice president in charge of engineering. Mr. Laegeler, who formerly held the position of chief engineer, has been with the company since 1951. He in turn has announced the appointment of Keith W. Kampert as chief engineer, product design, and Thorvald Granryd as chief engineer, research and development. Mr. Kampert has been with the company since 1948 and Mr. Granryd, since 1951.

1963 Road Show Committee

CIMA PRESIDENT, Don Buttenheim has announced appointment of a 1963 Road Show Committee to establish CIMA policy and give over-all supervision to the administration and execution of the huge exhibit. Boyd S. Oberlink, senior vice president of the Allis-Chalmers Mfg. Co., will serve as chairman of the committee, with A. J. Lichtinger, executive vice president of the Wellman Eng. Company, as vice chairman.

Barnes honored at dinner

A RECOGNITION DINNER, honoring his 40 years of service was given for Donald D. Barnes, (left) retiring president of Smith Eng. Works, Div. Barber-Greene Co., Aurora, Ill. Paying tribute to Mr. Barnes were H. A. Barber and William B. Greene, president and board chairman respectively of the parent firm, and Mr. Gerald L. Smith (right) who succeeded to the presidency of the Milwaukee firm.

Mr. Barnes began his career with Smith in 1919. He became president in 1952 upon the death of Mr. Charles F. Smith, son of the company's founder, Mr. T. L. Smith. Mr. Barnes will continue to serve as a member of the Barber-Greene Co. board of directors.

Burnhart pres. of Longyear

VINCENT N. BURNHART (photo) has been elected president of the E. J. Longyear Co., Minneapolis, Minn. He succeeds Donald M. Davidson, who died recently. Mr. Burnhart, formerly vice president and general manager, joined the company in 1946. He became vice president in 1958. He is a director of the Longyear Co. and of the Canadian Longyear Ltd., North Bay, Ontario. He also is president of the Diamond Core Drill Manufacturers Association.

Longyear directors also have named four new vice presidents. They are Rudolph C. Gebhardt, vice president, mining; Michal J. Gleason, vice president, contract drilling; Eugene Larson, vice president, marketing, and John F. Hoffmeister, vice president, manufacturing.

Ewing retires from J. I. Case

WILLIAM EWING has retired as a director of J. I. Case Co., Racine, Wis., after serving on the board continuously for 40 years. The company's board of directors elected H. Edward Vollmers to the Board of Directors to fill the vacancy resulting from Ewing's resignation.

(Continued on page 165)

Variable speed a.c. motors simplify drives for Dundee Cement Co.

BROWN BOVERI

by Werner K. Haessler, Project Engineer, Brown Boveri Corp.

Cement mill operations make unusual demands on drive systems. Blower and kiln drives, for example, are in 24-hour operation making efficiency and power factor important. Speed must be varied to suit process and draft requirements. Speed must also be kept constant under varying loads.

The Brown Boveri rotor-fed three phase shunt commutator motor provides a precise, economical solution. It has better efficiency than any other variable speed drive and a high power factor. It provides simple, stepless speed control. And speed is practically constant under varying loads.

Low cost

Speed is controlled by simply changing the position of the brushes with a servo-motor or handwheel; no motor-generator set, clutch or mechanical speed changer is required. No auxiliary switchgear is needed other than a standard starter.

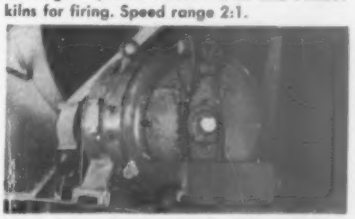
Other advantages

Full torque over entire speed range. Simple synchronization and adjustment of speed ratio or load balance for two or more motors.

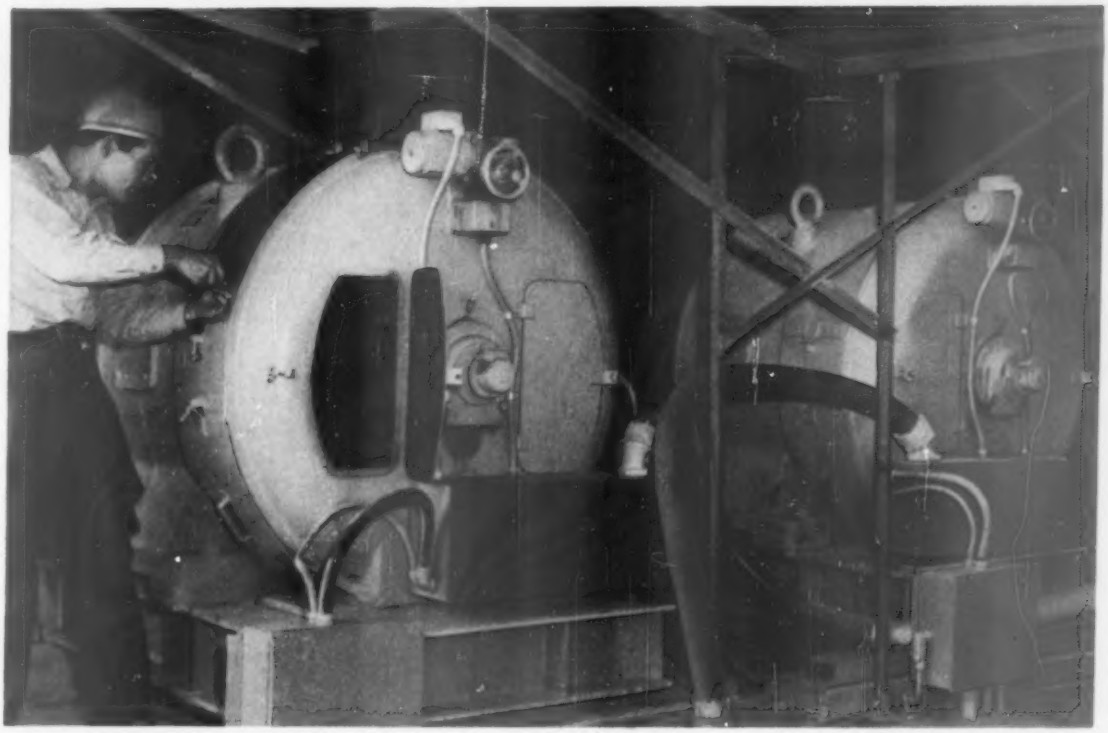
A complete line

Sizes from 1 to 500 hp, speed ranges as high as 1:50 and designs for any mounting or exposure condition. Brown Boveri shunt commutator motors are in steady trouble-free service in the U. S. and around the world—driving blowers, kilns, printing presses, machine tools, conveyors, compressors, etc. Write for descriptive literature and Cost Estimate Questionnaire.

One of two 200-hp motors driving primary fans blowing coal, cement dust and air into Dundee kilns for firing. Speed range 2:1.



One of two 250-hp motors driving Dundee exhaust fans. Speed range 2.4:1.



Twin drive for kiln at new Dundee Cement Co. plant at Dundee, Mich. Each motor is 250 hp with speed range of 3:1. A simple regulator equalizes power input and thus equalizes the load. Brushes on commutator and slip rings are easily accessible as shown at left. The second Dundee kiln uses a similar twin drive. All motors illustrated are 440v, 60c.

BROWN BOVERI Brown Boveri Corp., Dept. PQ11, 19 Rector Street, New York 6, N. Y. Agents in 27 U. S. cities

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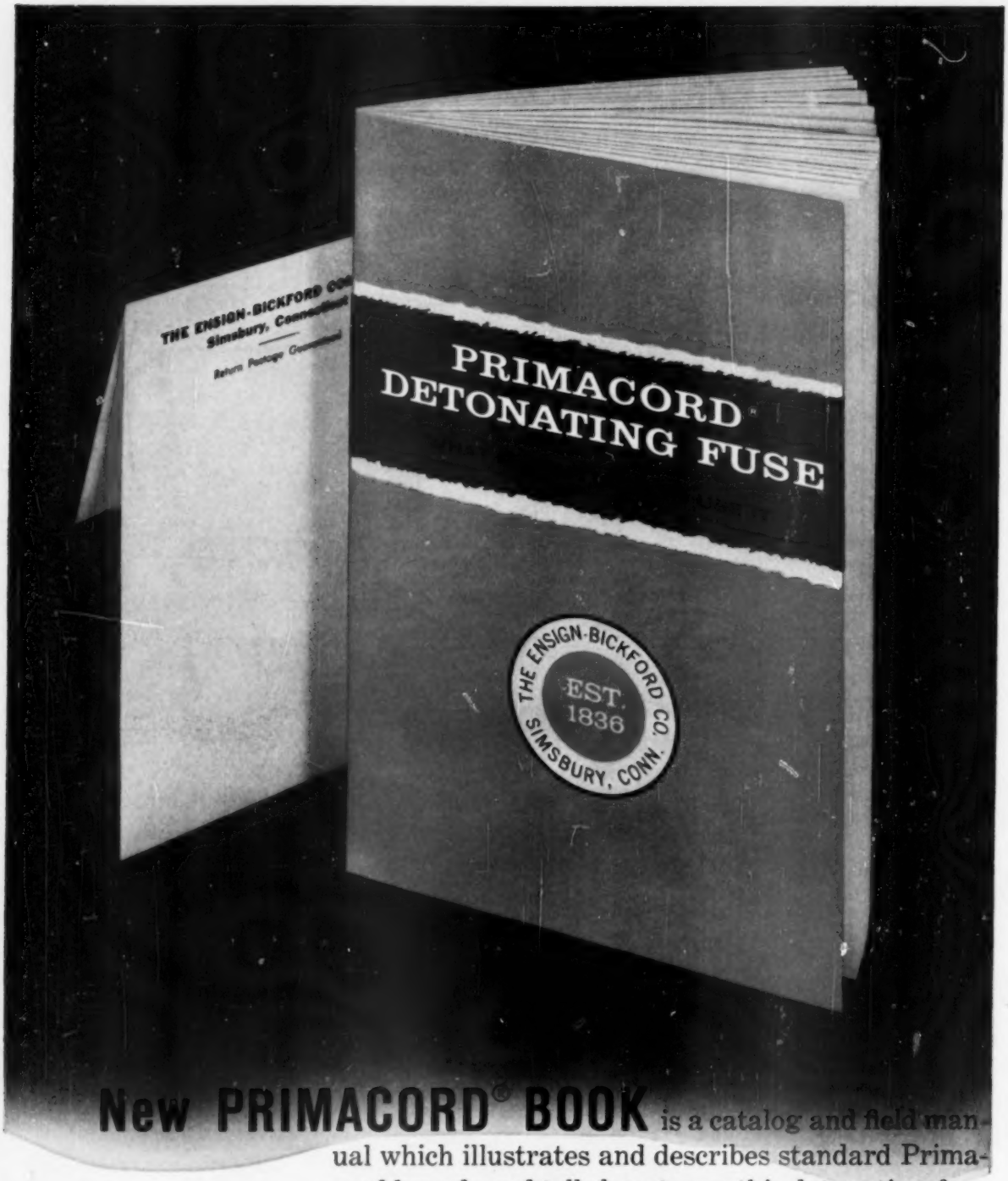

New PRIMACORD® BOOK is a catalog and field manual which illustrates and describes standard Primacord brands and tells how to use this detonating fuse to obtain better blasting with greater safety and profit—in mining, quarrying and construction work.

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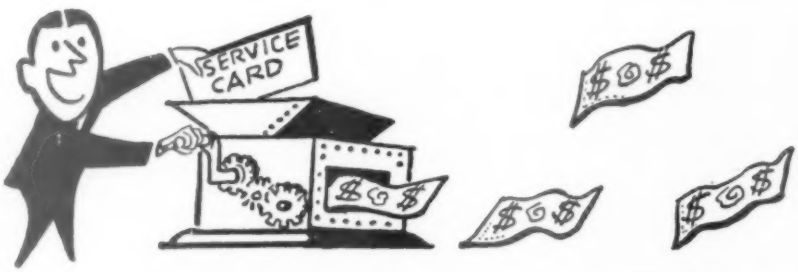

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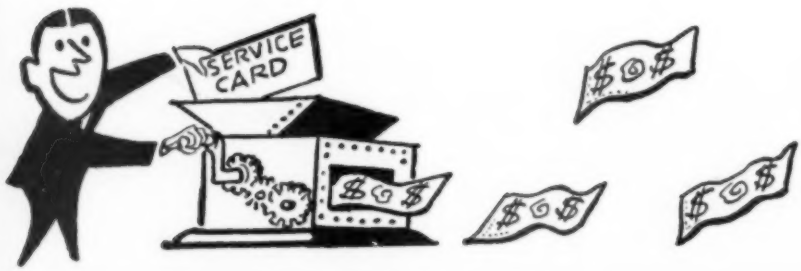


(Continued from page 160)

New appointees at Smith Engr. Works

WILLIAM P. MCCONNELL (left) has been appointed domestic sales manager for the Smith Engineering Works, manufacturer of rock products processing machinery. Mr. McConnell has been Pacific Northwest district manager for the last five years. John P. Rudow succeeds Mr. McConnell in that position. Nicholas J. Arnold has been appointed chief service engineer in Milwaukee. He has been with the company for five years.

Patterson re-acquires Canadian subsidiary

THE PATTERSON FOUNDRY & Machine Co., East Liverpool, Ohio, has re-acquired its former subsidiary, Patterson Foundry & Machine Co. (Canada) Ltd. Purchased from Ferro Corp., Patterson of Canada will be operated as a subsidiary with main office and plant in Toronto. Willard W. Mason has been named general manager of the subsidiary. Both Patterson and International equipment will be built in the Toronto plant and sold through Canadian outlets. The companies manufacture machinery for chemical, paint, plastic and other related industries.

TDC expands line

TWIN DISC CLUTCH CO., Racine, Wis., has announced plans for the expansion of its product line to include power-shift transmissions and universal joints.

The new transmission is a five-speed forward, one-speed reverse unit, designed for engines developing up to 420 net hp. at speeds up to 2,100 rpm. It is a straight-through countershaft type with constant mesh gearing and oil-cooled, hydraulically-actuated clutches. A new 18-in. single-stage torque converter with freewheeled stator, hydraulic retarder and lock-up clutch is also in production. The converter and transmission will be furnished as a package unit or if preferred, for independent transmission mounting.

Scheduled for production in early 1961 is the company's new line of universal joints. These assemblies will be manufactured at the company's hydraulic div. plant in Rockford, Ill. The line of U-joint assemblies to be built will be for medium to heavy-duty applications. It is claimed that capacities will range from about 2,000 to 5,000 lb.-ft. torque.

H-R acquires Union Chain

HEWITT-ROBINS INC., Stamford, Conn., has consummated the acquisition of the assets of the Union Chain & Mfg. Co., for 51,250 shares of the Hewitt-Robins common stock. Hewitt-Robins manufactures material handling and processing equipment, conveyor belting, industrial hose and power transmission machinery. Union Chain produces conveyor and power transmission chain and sprockets. E. F. Emmons, former president of Union Chain, will be president of the new division.

(Continued on page 166)

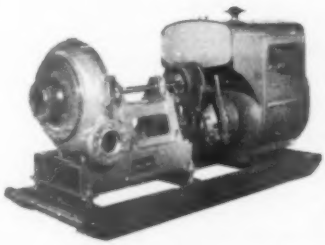
PERFORMANCE-PROVED DESIGN for CONTINUOUS PEAK DELIVERY

lightning SAND AND GRAVEL PUMPS

Model MA 6" & 8"

Compact Design . . . Rugged Construction

LIGHTNING Model MA handles large quantities of sand and gravel economically, up to a total head of 100'. Simple design makes it easy to maintain close internal clearances. Rugged construction withstands the shock of large solids passing through. Large, clean passages insure maximum and continuous delivery.



Available Mounted on Skid Base Complete with Gasoline Engine

Close coupled with V-belt drive. Either pump or industrial gasoline engine may be removed from the structural steel base for separate use. Model MA pump is light in weight and compact, for easy handling.

"Sixty years of service to the sand and gravel industry." We offer a complete line of pumps including rubber-lined and new ceramic-lined models. Write for complete information.

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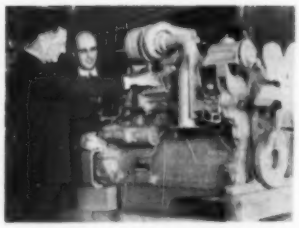
(Continued from page 165)

Vulcan to move

IT HAS BEEN ANNOUNCED by H. G. Warrington, president of the Vulcan Iron Works, Inc., that after being in Chicago since its founding in 1852, the company will move its entire manufacturing facilities and offices to Chattanooga, Tenn., effective Nov. 1, 1960. The Cunningham-Limp Co. of Detroit, Mich., general contractors, are at the present time constructing new plant and office facilities in Chattanooga. Mr. Warrington stated that the principle reasons for relocating the company were for economic factors and the better proximity to the company's major suppliers.

New diesel truck engine

THE TRUCKING INDUSTRY gains another engine manufacturer with the introduction by Caterpillar Tractor Co., Peoria, Ill., of its No. 1673 diesel truck engine. This engine offers 220 hp. at 2,200 rpm. It is a 6-cylinder turbocharged and after-cooled power plant



of 4.5 x 5.5-in. bore and stroke. An estimated 85 to 90 percent of diesel trucks on the road are in the horsepower class to use this engine. These trucks have a GVW. of 26,000 lb. or more, or gross combined weights of 50,000 to 75,000 lb. In the 1,900 to 2,100-rpm. range, the engine uses only .398 lb. of fuel per brake hp. hour.

Fred V. Jacobs, Engine Div. sales manager (photo, right), stated that the company is now providing a diesel truck engine that a large number of people in the truck trade have wanted. J. G. Edwards (photo, left), chief engineer, also views the new engine.

T-R-W changes name

TRW COMPUTERS Co. has been announced as the new name for the Thompson-Ramo-Woolridge Products Co. The company will continue to function as a computer division of Thompson Ramo Woolridge Inc. Headquarters will remain in Beverly Hills, Calif.

Dr. J. F. Mamldi, general manager of the division stated that, "Our scope of activity in the field of computer control has broadened as we have developed new computer applications, and a new name has become desirable to describe our broader interests in this expanding field."

Florence named president Cleveland Crane & Eng. Co.

MR. HERBERT T. FLORENCE (left) has been elected president and general manager of The Cleveland Crane & Eng. Co., Wickliffe, Ohio. He succeeds Mr. Charles F. Safreed who has been made chairman of the board. Since the company became a subsidiary of The McNeil Machine & Eng. Co. in 1949, Mr. Florence was executive vice president and general manager of Cleveland Crane and a director of McNeil. Mr. Safreed, who is one of the founders of The McNeil Machine & Eng. Co., is actively engaged in the direction of McNeil's subsidiaries.

END

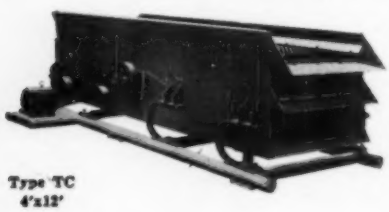
4'x12' KOLMAN Triple-Deck Screen Handles 120 Tons an Hour

Making specification aggregate in Southern Kansas calls for screening large volumes of fine material. When Mr. George Myers of Myers Materials, Inc. installed his new washing plant at Arkansas City, Kansas to produce concrete sand, engine sand and mason sand, his operation demanded a vibrating screen capable of handling fines effectively. His choice — a Model TC-120-48 KOLMAN Triple Deck Screen 12' long x 48" wide.

This high speed, vigorous action screen has proved itself fully capable of the rugged assignment. It receives material from the 8" pump at an average rate of 120-130 TPH. Everything under 2" hits the ¾" square opening screen cloth on the top deck, where less than 5% of the feed is removed. For certain specifications, a No. 4 screen is used on the middle deck.

But frequently the center screen is not used, and the full load of minus ¾" goes directly to the 6 mesh oblong opening bottom screen. Here 40% to 50% of the 120-130 TPH feed must pass, with a very minimum of carryover. Ralph Bridges, Plant Manager and John Bucher, Plant Superintendent, report that their KOLMAN Screen takes care of this separation beautifully. With slots running crosswise, the rapid, sharp stroke of the KOLMAN eliminates blinding on the 6 mesh screen in spite of the great amount of oversize on the deck and even in the most difficult areas of the pit.

KOLMAN Screens are designed for a wide variety of applications, including the toughest washing and crushing jobs as well as the light weight portable plant installations. Your KOLMAN dealer will be glad to provide you with complete data and the names of owners in your locality.



Type TC 4'x12'

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Komarek-Greaves 27"x24" Briquet Presses
6'x25'; 6'x50' Louisville Rotary Dryers
7'x50'; 8'8"x70' Ruggles-Coles Dryers
Traylor 8'x11' Steel Lined Ball Mill
Allis-Chalmers 7'x24' Mill
Dixie #5060 Mogul Hammermill
Penna. SX13 Hammermills, 400 HP
Heil Patterson Crushers, 100 HP
Raymond 5 Roll #5057 Hi-Side Mill
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Koppers 36"x42"—2 Roll Crushers
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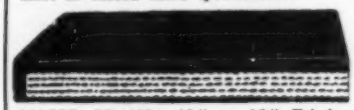

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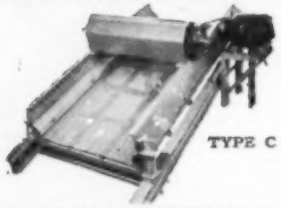

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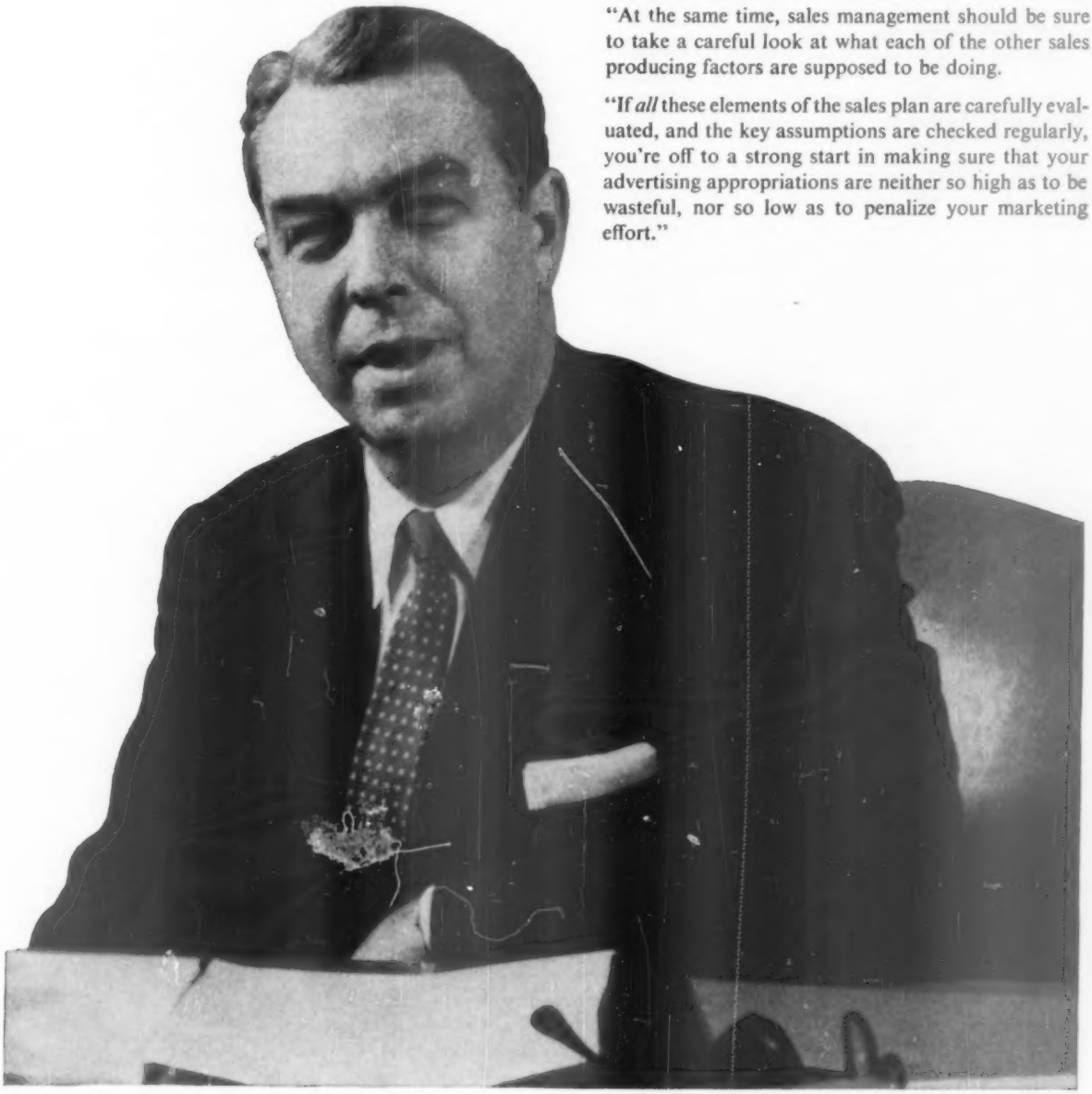

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NATIONAL CRUSHED STONE ASSOCIATION

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- SESSION FOR SALESMEN

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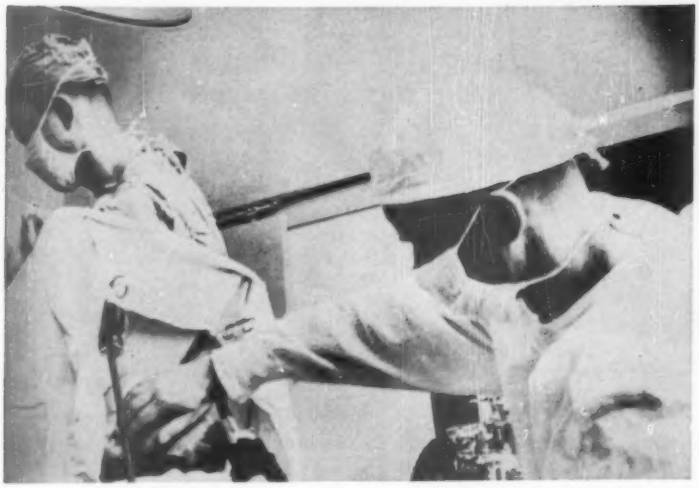

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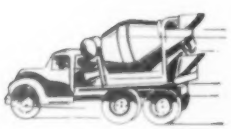

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ROCK PRODUCTS' board of analysts says that pessimism toward 1961 business, which prevails in some quarters, doesn't apply to our industry. They project a record output year for us. This will be reported in our January 1961 issue.

At least two industry authorities project almost unbelievable growth of rock products for the long pull. Dr. A. Allen Bates, vice president of research and development of the Portland Cement Association, is credited with this statement: "Within the next 35 to 40 years, we are going to have to build a physical plant equal to all the plants now existing." He projects dollar volume of all types of construction at $150-160 billion by 1980 —more than double the current rate.

A producer, American-Marietta Co., believes that, based on current trends, all construction aggregates now being produced each year will be needed just for highway building by 1975. In cold figures, that means well over a billion tons of aggregates a year for road construction in 15 short years.

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A word of caution, though. A mere projection doesn't mean that future demands for industry products will be met easily, nor economically. Growth will be accompanied by a rising number of more serious problems. The future holds for the industry its greatest challenge.

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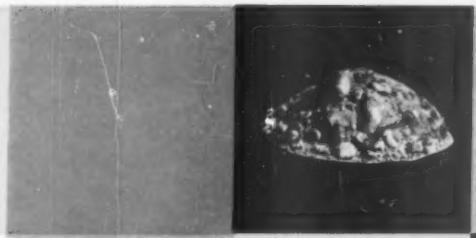

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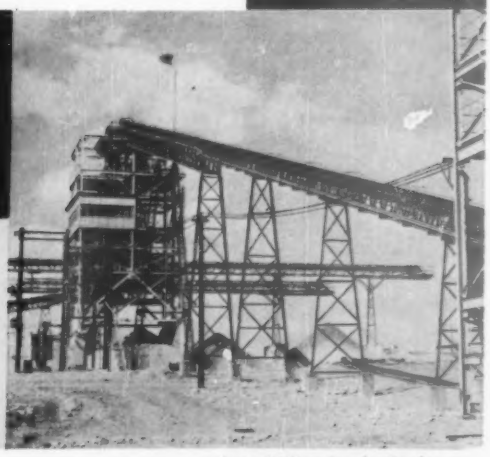

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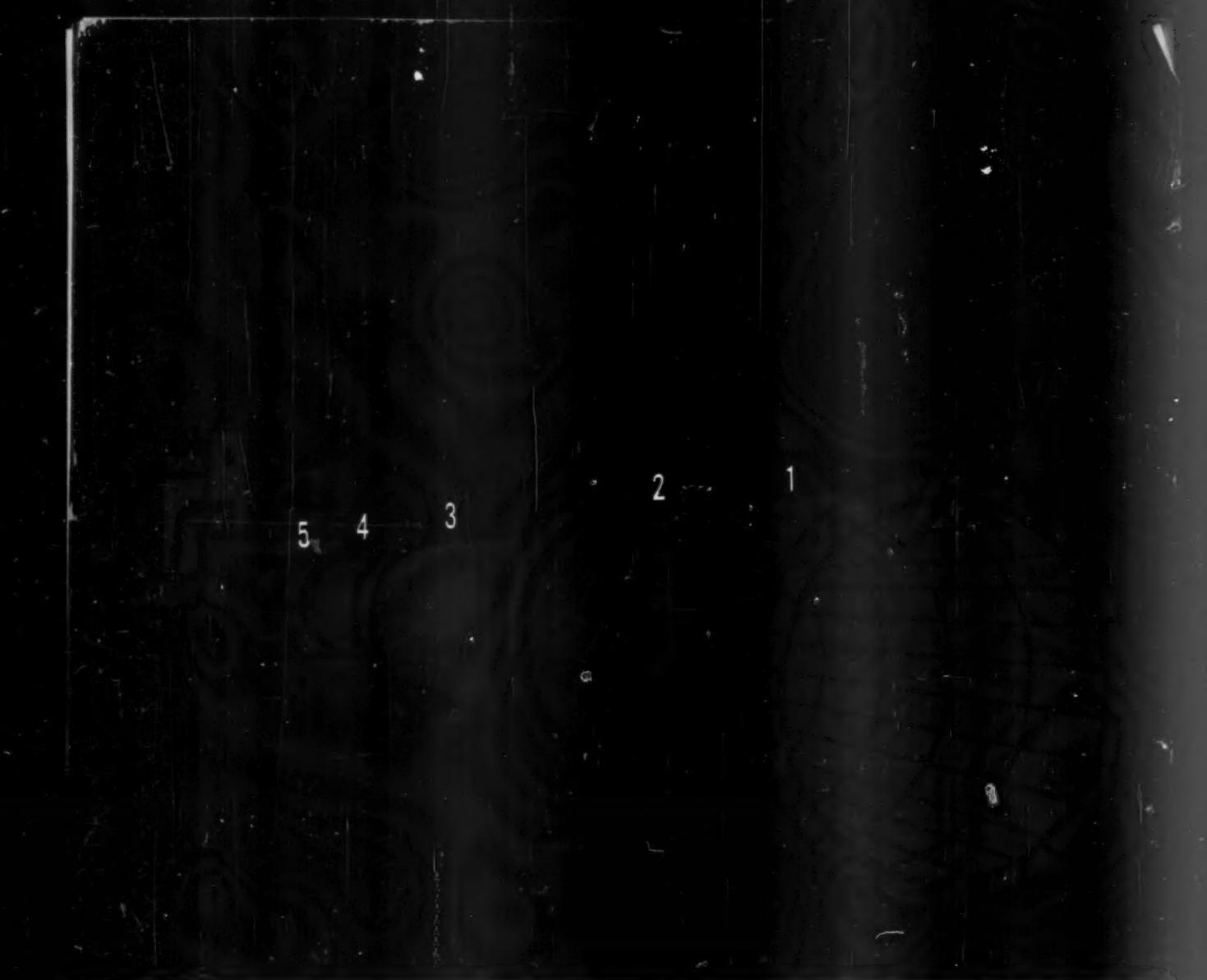

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